



Maryland Energy Administration Clean Fuels Technical Assistance Program: Howard County

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and
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ICF



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Executive Summary

The Maryland Energy Administration (MEA) [Clean Fuels Technical Assistance](#) (CFTA) Program has provided this fleet advisory service for Howard County (County), through a partnership with ICF, and support from Maryland Clean Cities. ICF analyzed the Howard County fleet comprised of 771 vehicles for electrification in two total cost of ownership (TCO) scenarios.¹ The first scenario utilizes a 0% TCO threshold and assumes the County receives no financial support, recommending 235 internal combustion engine (ICE) vehicles for electrification. The second scenario utilizes a 15% TCO threshold and assumes the County receives financial support, recommending 290 ICE vehicles for electrification.² In addition to TCO, the assessment and recommendations are based on electric vehicle (EV) make and model availability. The conversions would take place over a nine-year timeframe³, with the actual number of vehicles eligible for electrification likely increasing over this time as more EV makes and models become available.

Based on our analysis, converting ICE vehicles to EVs is estimated to produce the following impacts over 23 years⁴ of vehicle ownership⁵:

Scenario 1 (0% TCO)	Scenario 2 (15% TCO)
\$10,198,542 TCO savings over 23 years of vehicle operations	\$10,246,648 TCO savings over 23 years of vehicle operations
\$8,486,510 fuel cost savings over 23 years of vehicle operations	\$9,414,661 fuel cost savings over 23 years of vehicle operations
\$3,286,214 maintenance savings over 23 years of vehicle operations	\$3,670,436 maintenance savings over 23 years of vehicle operations
37,243 metric tons (MT) of greenhouse gas (GHG) eliminated over 23 years of vehicle operations	41,377 MT of GHG eliminated over 23 years of vehicle operations
258,921 gallons of gasoline and 10,794 gallons of diesel displaced annually	359,127 gallons of gasoline and 10,794 gallons of diesel displaced annually
Equivalent to eliminating 4,283 homes' energy use annually	Equivalent to eliminating 4,758 homes' energy use annually

¹ After an initial review, the County requested that medium-duty pickups be excluded from recommendations due to local vendor and repair support concerns.

² Incentives include Diesel Emissions Reduction Act funding, Low-No Emission Vehicle funding, and EV tax credits.

³ 2024 to 2032

⁴ 2024 to 2046

⁵ Based on the Assumptions and Calculations outlined in Appendix A, as then applied to the U.S. Environmental Protection Agency's Greenhouse Gas Equivalencies Calculator, <https://www.epa.gov/energy/greenhouse-gas-equivalencies-calculator>

Introduction

The State Fiscal Year (FY) 2022 CFTA Program aims to provide eligible local government and municipal fleets with technical assistance as they consider alternative transportation fuel options. This program is a continuation of MEA’s FY 2021 CFTA Pilot Program and complementary to FY 2022 [Clean Fuels Incentive Program](#). Through CFTA, a technical assistance contractor, ICF, employed by MEA was tasked to work directly with eligible fleets, selected via an application process, for the purpose of developing potential alternative fuel fleet strategies for on-road light-, medium-, and heavy-duty vehicles. Possible alternative fuels for evaluation include electricity, ethanol, hydrogen, natural gas, propane, and other biofuels. The participating local government or municipal fleet chooses their preferred fuel for technical evaluation. Howard County selected fleet electrification for their technical assistance.

This assessment includes vehicle electrification recommendations, an economic analysis of vehicle electrification, an emissions analysis of electrification recommendations, an overview of charging infrastructure needed to support the electrification recommendations, and best practices based on the County’s primary concerns.

Overview of Motivations and Priorities

In 2020, the County adopted a Green Fleet Policy. The Green Fleet Policy aims to support a variety of sustainability goals, including adopting idle reduction technology and practices, increasing fuel efficiency, reducing vehicle miles traveled, reducing the number of domiciled vehicles, and electrifying the fleet. By participating in MEA’s Smart Energy Communities program, the County has already been able to electrify several fleet vehicles.

In October 2022, the County set new GHG emissions reductions goals:

- Reduce emissions 60% below 2005 levels by 2030
- Achieve net-zero GHG emissions by 2045.

To support GHG reduction goals, the County set a target to reduce fleet petroleum fuel consumption 20% below 2019 levels by 2024. Electrifying fleet vehicles is a crucial component to the County’s GHG and fuel consumption goals. In their 2022 Climate Action and Resiliency Plan, the County notes that it will pursue an accelerated schedule for fleet vehicle electrification.⁶ The County is utilizing the CFTA Program to help plan fleet electrification, summarize general charging needs, estimate TCO savings potential, and improve the environmental health of the community. Ultimately, this report will provide a roadmap for procuring EVs, supporting the County’s fleet and GHG goals and reducing the fleet’s impact on the environment and community.

⁶ Howard County. 2022. “Howard County Climate Forward: Climate Action and Resiliency Plan.” Retrieved from: <https://livegreenhoward.com/wp-content/uploads/2022/12/HoCo-Climate-Forward.pdf>

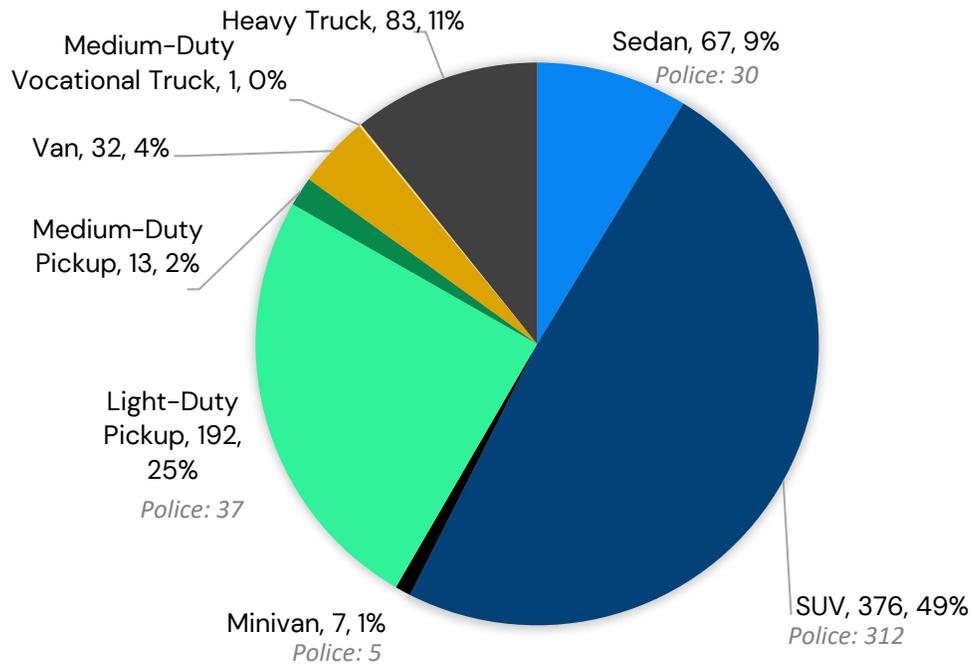
Current Fleet Inventory

The County provided fleet data for 771 vehicles, and ICF’s evaluation included all 771 on-road light-, medium-, and heavy-duty fleet vehicles. Most vehicles operate on gasoline or diesel fuel, but the County does have three plug-in hybrid electric vehicles (PHEVs) and 12 EVs currently in the fleet. To support existing fleet EVs, the County has installed 17 Level 2 electric vehicle supply equipment (EVSE) for fleet use, 51 Level 2 EVSE for public use, and 9 direct current fast chargers (DCFC) for public use. The evaluated fleet is primarily composed of heavy trucks, sport utility vehicles (SUVs) and light-duty pickups. Table 1 and Figure 1 break down the County fleet by vehicle type.

Table 1. Existing Fleet by Vehicle and Fuel Type

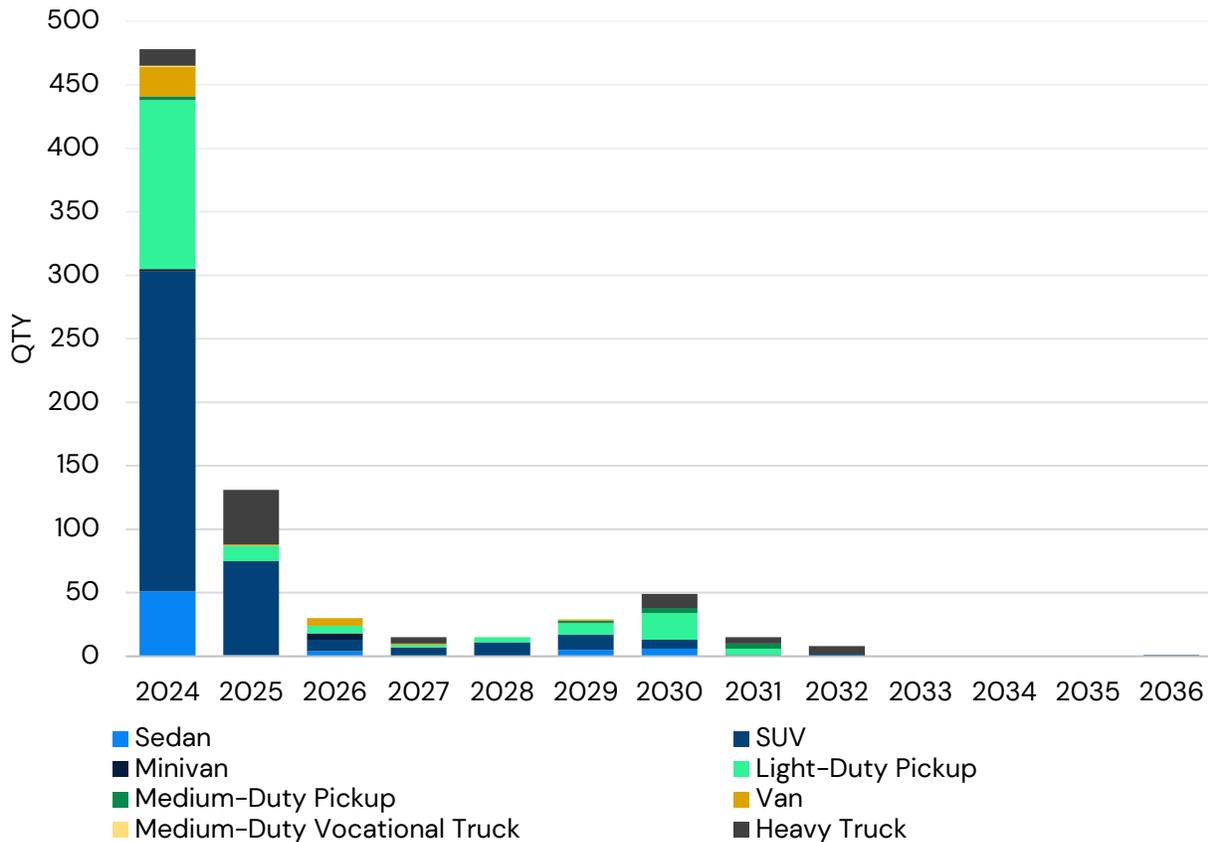
Vehicle Type	Gasoline	Diesel	PHEV	EV
Sedan	54	0	1	12
SUV	374	0	2	0
Minivan	7	0	0	0
Light-Duty Pickup	181	11	0	0
Medium-Duty Pickup	12	1	0	0
Van	32	0	0	0
Medium-Duty Vocational Truck	0	1	0	0
Heavy Truck	0	83	0	0
TOTAL	660	96	3	12

Figure 1. Existing Fleet by Vehicle Type



This assessment assumes vehicle replacement and electrification will begin in 2024. Typically, because the assessment begins in 2024, vehicles retiring before 2024 would be excluded. However, the County requested the inclusion of vehicles with planned retirements in 2023 and earlier. To accommodate this request, vehicle retirement year is set to 2024 for all vehicles retiring prior to that year to prevent unnecessarily extending their lifespan. Including these vehicles in the assessment will provide the County with a baseline calculation to determine if it is financially feasible to electrify these vehicles now or if electrification may be more preferable in the next round of replacements. The County does not need to adhere to this retirement schedule and may choose to retire and replace vehicles when it is most suitable for the fleet. The County may use these findings to delay vehicle retirement until 2024 if electrification is financially feasible or as preliminary justification for electrifying these vehicles in the future. Figure 2 shows the breakdown of the existing fleet’s retirement schedule.

Figure 2. Existing Fleet Retirement Schedule



The vehicle retirement schedule used in this assessment is based on the assumptions identified by ICF and the County, as shown in Appendix A.⁷ The exact vehicle replacement schedule is determined by the County’s fleet manager. Actual vehicle retirement and

⁷ Due to the timing of this report, the County may choose to delay implementing the recommended fleet retirement and electrification schedule.

replacement may vary considerably from the proposed retirement schedule due to feasibility, lead times for new vehicles, and potential financial constraints. While vehicle retirement criteria will be met in 2024, the County may not be able to feasibly take vehicles out of rotation and purchase new vehicles for a few more years, especially if the County is willing to wait for EVs with longer lead times.

Fleet Electrification Assessment

Overview

This fleet electrification assessment includes 758 of the 771 vehicles provided to MEA and ICF. The fleet's 13 medium-duty pickups are excluded from the assessment at the County's request due to concerns related to local vendor and repair support.⁸ ICF examined all vehicles eligible for retirement beginning in 2024⁹ and evaluated opportunities for electrification, based on EV model availability as announced through the end of October 2022. Only one round of vehicle retirements and replacements is included in this assessment, and the current fleet is assumed to be entirely replaced by the end of 2032.

Recommendations are based on comparing the TCO of EVs versus ICE vehicles. The assessment considers two TCO scenarios set at 0% and 15% thresholds. A 0% TCO threshold means an EV must have a TCO less than or equal to an ICE vehicle to be recommended. Similarly, a 15% TCO threshold means that any vehicle with an EV equivalent whose TCO is less than, or up to 15% more than, an equivalent ICE vehicle will be recommended for electrification. In the 15% scenario, it is assumed that the County will receive some financial incentives¹⁰ to support EV and PHEV purchases. In future years, it is assumed that the County will continue to replace electrified vehicles with EVs. Similarly, as the EV market develops, more models will become available, vehicle purchase prices will decrease, and the County will likely be able to obtain more EVs.¹¹

This fleet electrification evaluation assumes that non-police fleet vehicles are primarily located on government property and police vehicles are domiciled at officer homes. This consideration is particularly important in determining fleet EVSE needs, including general charging assumptions and infrastructure costs that may be required to support electrification recommendations. The results within this report can be used as a preliminary guide for EVSE planning, but a detailed siting assessment should be completed before the County begins installation.

⁸ This concern will likely diminish over time. Local vendor and repair support will likely become more readily available over the next several years as more EVs are available and registered in the area.

⁹ As noted earlier in the report, the assessment assumes all vehicles retiring in 2024 and earlier are set to retire and be replaced in 2024.

¹⁰ Incentives include Diesel Emissions Reduction Act funding, Low-No Emission Vehicle funding, and EV tax credits. Only incentives available at the time of this assessment are considered.

¹¹ This assessment provides recommendations for a snapshot in time, assessing the fleet and market as they currently exist. This assessment also only evaluates one replacement cycle. The County should reevaluate vehicle TCOs in future replacement cycles for up-to-date cost estimates.

The County worked with ICF to set assessment assumptions, including assessment start year, fuel prices, any Buy America requirements, and standardizations for fleet data outliers. A full list of assessment assumptions is in Appendix A. As the fleet changes, the EV market evolves, and new financial incentive programs become available, the County should revisit the following recommendations and reevaluate electrification opportunities. For a simple approach to TCO assessments, the County can utilize Argonne National Laboratory’s AFLEET Tool.¹²

Recommendations

Of the 771 vehicles eligible for retirement based on fleet data, assessment assumptions, and EV make and model availability, 235 are recommended for electrification in the 0% TCO Scenario and 290 are recommended for electrification in the 15% TCO Scenario. Table 2 shows the electrification recommendations by vehicle type.

Table 2. Electrification Recommendations by Vehicle Type

Vehicle Type	Total Quantity	Electrification Recommendations (Scenario 1 – 0%)	Electrification Recommendations (Scenario 2 – 15%)
Sedan	67	8	21
SUV	376	63	89
Minivan	7	0	1
Light-Duty Pickup	192	151	155
Medium-Duty Pickup	13	0	0
Van	32	12	23
Medium-Duty Vocational Truck	1	1	1
Heavy Truck	83	0	0
TOTAL	771	235	290

This assessment provides a list of EV make and model recommendations that the TCO analysis is based on, shown in Table 3. These vehicle recommendations are examples not requirements. The County may adopt similar vehicles and achieve similar savings outlined in the Economic Analysis and Emissions Analysis sections of this report.

Table 3. EV Recommendations by Vehicle Type

Vehicle Type	Vehicle Recommendations – Or Similar (Scenario 1 – 0%)	Vehicle Recommendations – Or Similar (Scenario 2 – 15%)
Sedan	Nissan Leaf	Nissan Leaf
SUV	Kia Niro PHEV Chevrolet Equinox EV Ford Mustang Mach-E Premium RWD Extended Range (Police)	Kia Niro PHEV Chevrolet Equinox EV 1LT Ford Mustang Mach-E Premium RWD Extended Range (Police)
Minivan	N/A	Chrysler Pacifica PHEV Touring L

¹² The AFLEET tool may be found here: <https://greet.es.anl.gov/index.php?content=afleet>. Additional information is available in Appendix E.

Vehicle Type	Vehicle Recommendations – Or Similar (Scenario 1 – 0%)	Vehicle Recommendations – Or Similar (Scenario 2 – 15%)
Light-Duty Pickup	Chevrolet Silverado EV	Chevrolet Silverado EV
Van	Ford E-Transit Cargo Van	Ford E-Transit Cargo Van
Medium-Duty Vocational Truck	Ford E-Transit Chassis Cab	Ford E-Transit Chassis Cab

The replacement timeline for the fleet vehicles recommended for electrification in each scenario can be seen in more detail below in Figure 3 and Figure 5. Vehicle replacements take place over nine years due to the assumptions and data identified by ICF and the County. However, a number of barriers (e.g., financial constraints, slow supply chains, etc.) could extend the replacement timeline.

Figure 3. Recommended EV Replacement Timeline by Vehicle Type – Scenario 1

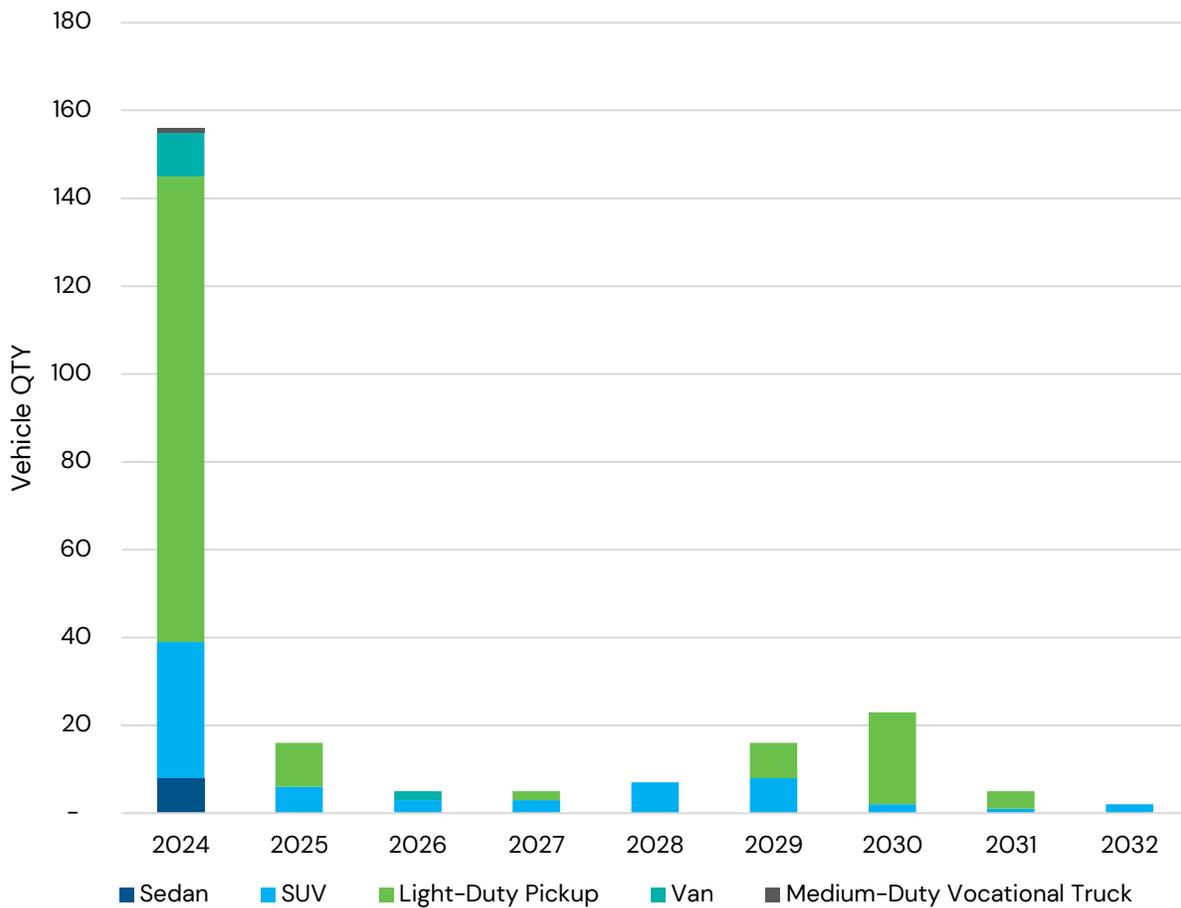
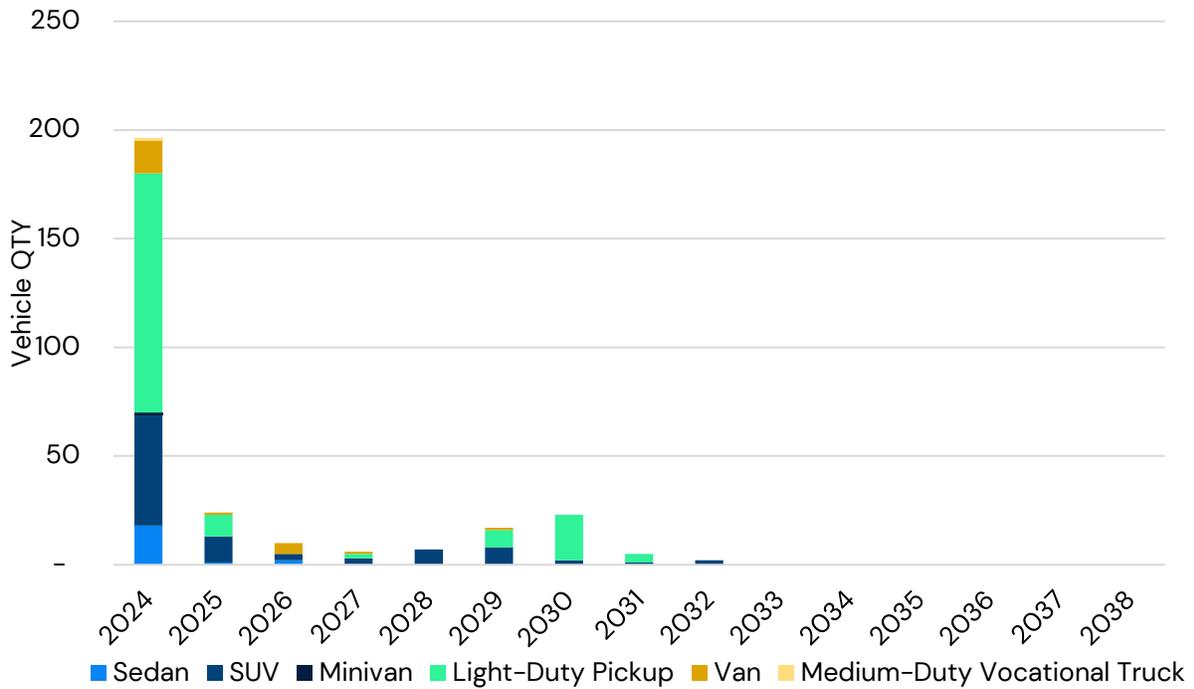


Figure 4. Recommended EV Replacement Timeline by Vehicle Type – Scenario 2



The EV replacement schedule is also broken down in Table 4 and Table 5 below.

Table 4. Recommended EV Replacement Timeline by Vehicle Type – Scenario 1

Vehicle Type	2024	2025	2026	2027	2028	2029	2030	2031	2032
Sedan	8								
SUV	31	6	3	3	7	8	2	1	2
Light-Duty Pickup	106	10		2		8	21	4	
Van	10		2						
Medium-Duty Vocational Truck	1								
TOTAL	156	16	5	5	7	16	23	5	2

Table 5. Recommended EV Replacement Timeline by Vehicle Type – Scenario 2

Vehicle Type	2024	2025	2026	2027	2028	2029	2030	2031	2032
Sedan	18	1	2						
SUV	51	12	3	3	7	8	2	1	2
Minivan	1								
Light-Duty Pickup	110	10		2		8	21	4	
Van	15	1	5	1		1			
Medium-Duty Vocational Truck	1								
TOTAL	196	24	10	6	7	17	23	5	2

Additional Considerations

For future models recently announced and currently nascent EV types, electrification recommendations do not take place until price parity between EV and ICE vehicles is achieved. However, while EV TCO may be more favorable than ICE TCOs, purchase price may still present a large barrier to adoption, limiting the County's ability to electrify in the short-term. If the County needs to delay electrification for any reason, it will likely result in larger first-generation electrification TCO savings for the fleet due to market gains. For example, there will be a larger number of EVs to choose from, potentially shifting or expanding vehicle replacement recommendations and saving opportunities. Similarly, as the EV market develops and continues making technological advancements, the County can expect the purchase price of EVs to drop and more favorable electricity rates (i.e., time-of-use rates, managed charging programs, etc.) for EV charging to become readily available. Any delay in the electrification timeline presented in this report means that, while the County will still see TCO savings, they will not be realized until the electrification begins.

A full list of vehicle recommendations is available in Appendix B.

While the recommendations listed in Table 3 and Appendix B list specific vehicle makes and models, the County is not obligated or required to purchase the exact vehicles recommended or purchase them in the year listed. Similar vehicle makes and models will offer similar opportunities for electrification as well as cost and emission savings.

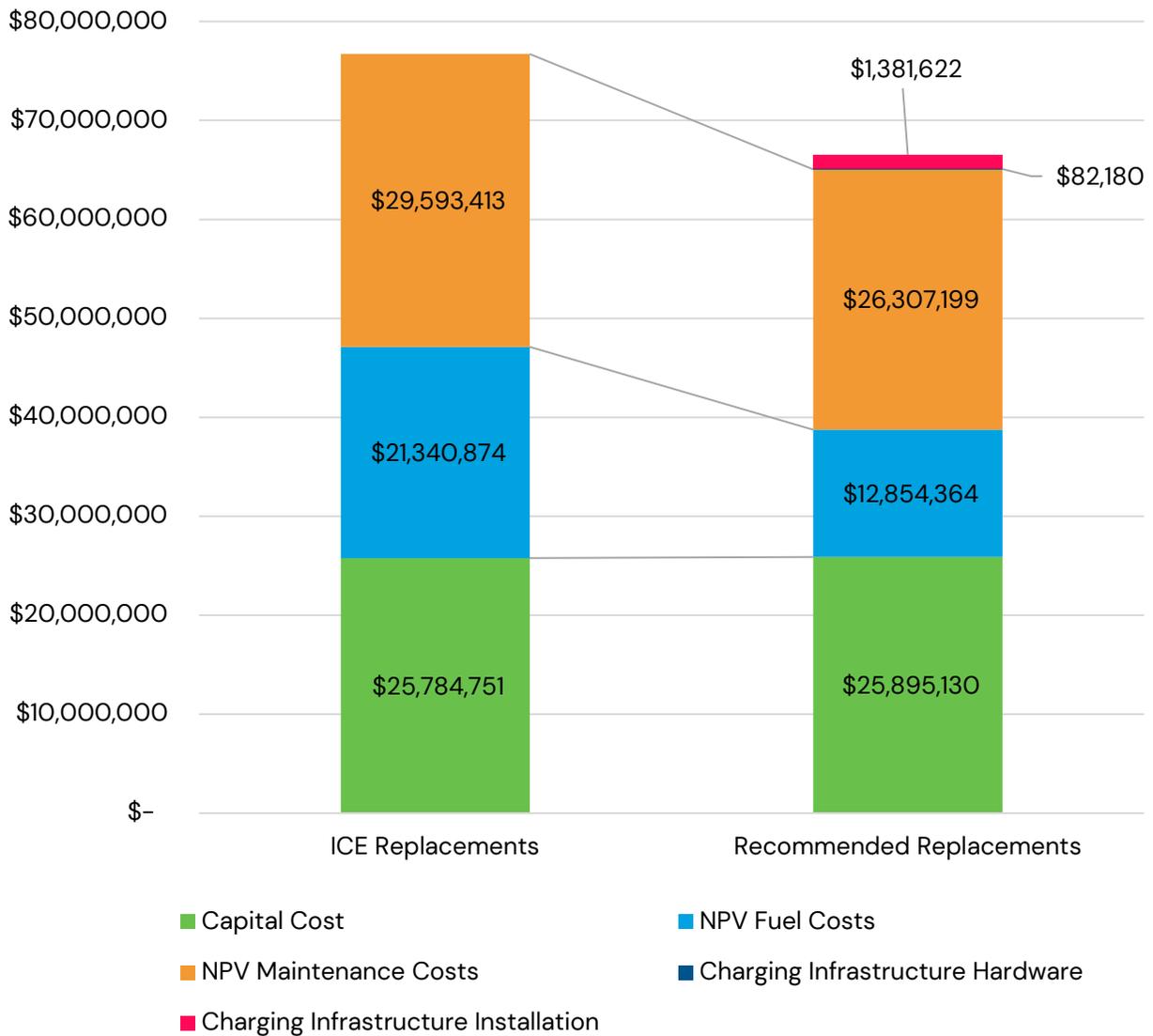
Economic Analysis

Electrification recommendations are based on a TCO assessment with two scenarios, a 0% TCO threshold and a 15% TCO threshold. Fleet vehicles are recommended for electrification in the EV option available falls in each scenario's TCO threshold. To determine the TCO, costs accumulated over fleet vehicle lifespans were evaluated. Beyond the cost to acquire, charge or fuel, and maintain vehicles, the TCO calculations also include the charging infrastructure necessary to support recommended EVs. Infrastructure cost assumptions are based on County reported values from previous installations and assume installing non-networked Level 2 and DCFC EVSE at a ratio of four vehicles to one charger.

Scenario One

Figure 5 includes the cost of all 235 recommended EVs and EVSE over vehicle lifespans compared to the traditional ICE vehicle replacement.

Figure 5. Fleet TCO Comparison - Net Present Value Costs Over Vehicle Lifespans (Scenario 1 - 0%)



As vehicles are replaced through 2032, lifespans and TCO calculations extend out to 2046.¹³ The TCO comparisons in Figure 6 and Figure 7 show that TCO savings will be realized in all years following 2025. After the initial capital costs associated with purchasing EVs to replace existing ICE fleet vehicles, the years following 2025 will all provide TCO savings.

¹³ The TCO calculation extends through the last replacement vehicle’s lifespan. Actual replacement timeline may be significantly longer based on vehicle availability and vehicle wear and tear.

Figure 6. Cumulative TCO Comparison From 2024 to 2046 (Scenario 1 – 0%)

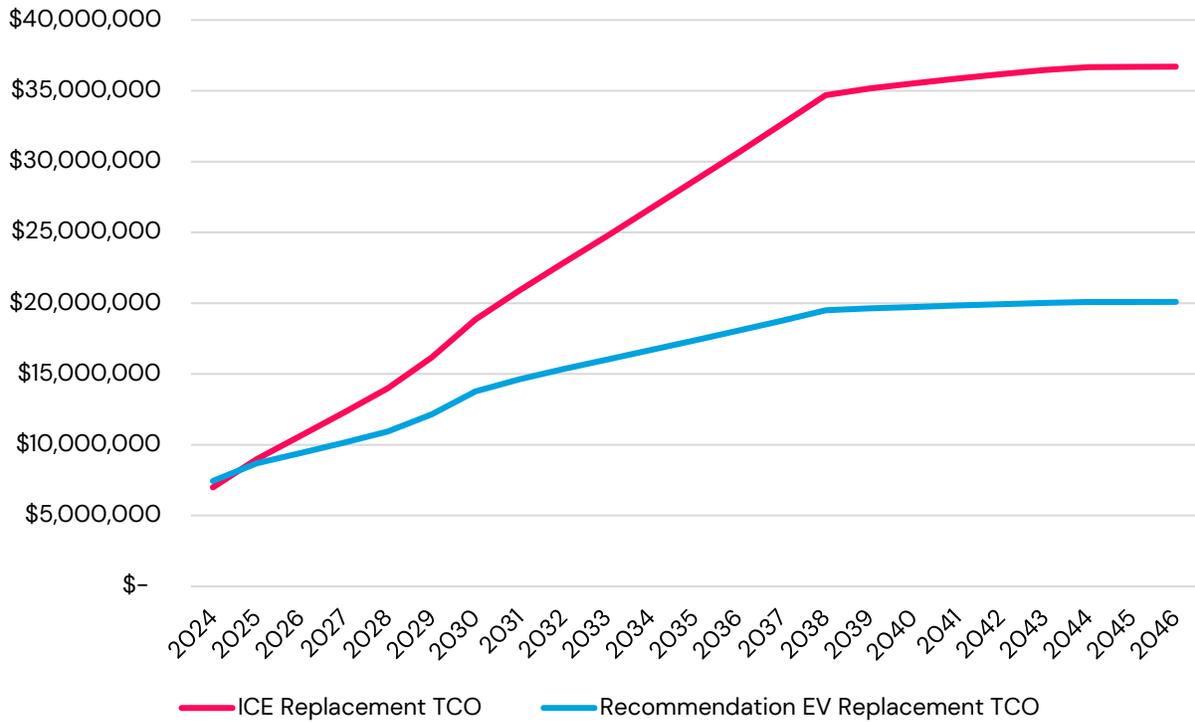
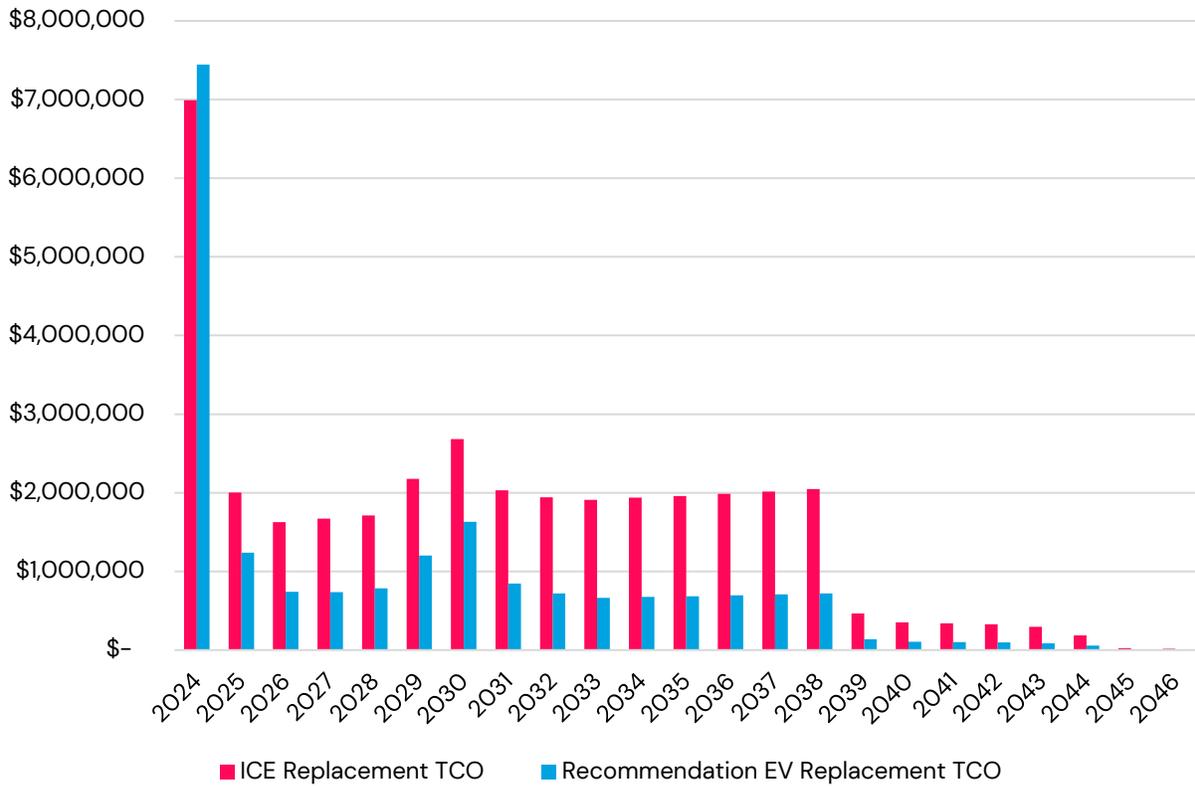


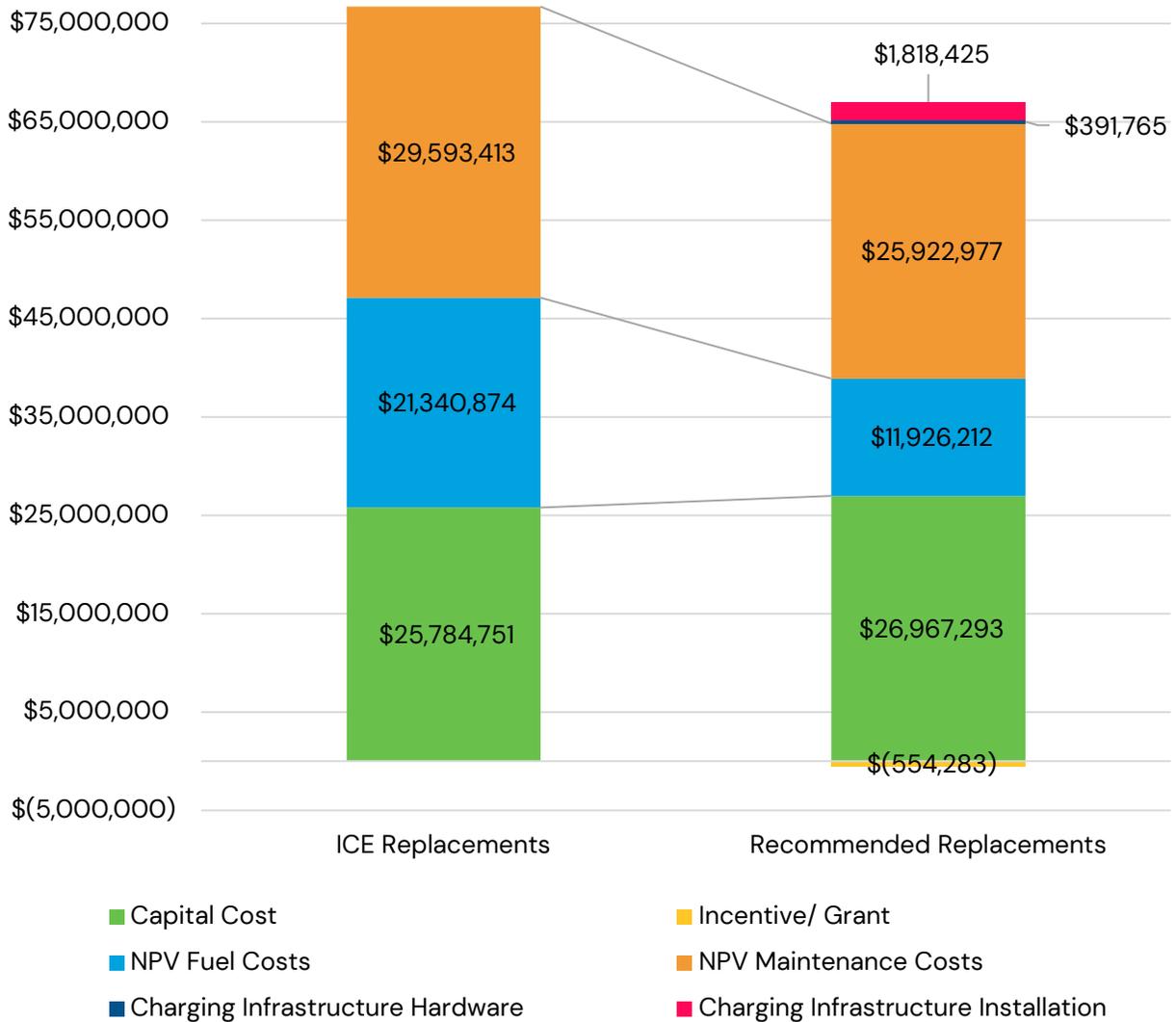
Figure 7. Annual TCO Comparison From 2024 to 2046 (Scenario 1 – 0%)



Scenario Two

Figure 8 includes the cost of all 290 recommended EVs and EVSE over vehicle lifespans compared to the traditional ICE vehicle replacement.

Figure 8. Fleet TCO Comparison – Net Present Value Costs Over Vehicle Lifespans (Scenario 2 – 15%)¹⁴



Please see U.S. Department of Energy’s (DOE) [Alternative Fuels Data Center](#) for all currently available [Maryland](#) and [Federal](#) EV and EVSE incentives. Information is also available at [MarylandEV.org](#).

¹⁴ The difference in charging infrastructure hardware costs between the 0% and 15% scenarios is primarily due to the increase in police vehicles recommended in the 15% scenario. Police vehicles are assumed to use DCFC stations instead of Level 2 stations. If the County decides to primarily use Level 2 stations for police vehicles this cost differential will decrease.

As vehicles are replaced through 2032, lifespans and TCO calculations extend out to 2046.¹⁵ The TCO comparisons in Figure 9 and Figure 10 show that TCO savings will be realized in all years following 2025. After the initial capital costs associated with purchasing EVs to replace existing ICE fleet vehicles, the years following 2025 will all provide TCO savings.

Figure 9. Cumulative TCO Comparison From 2024 to 2046 (Scenario 2 – 15%)

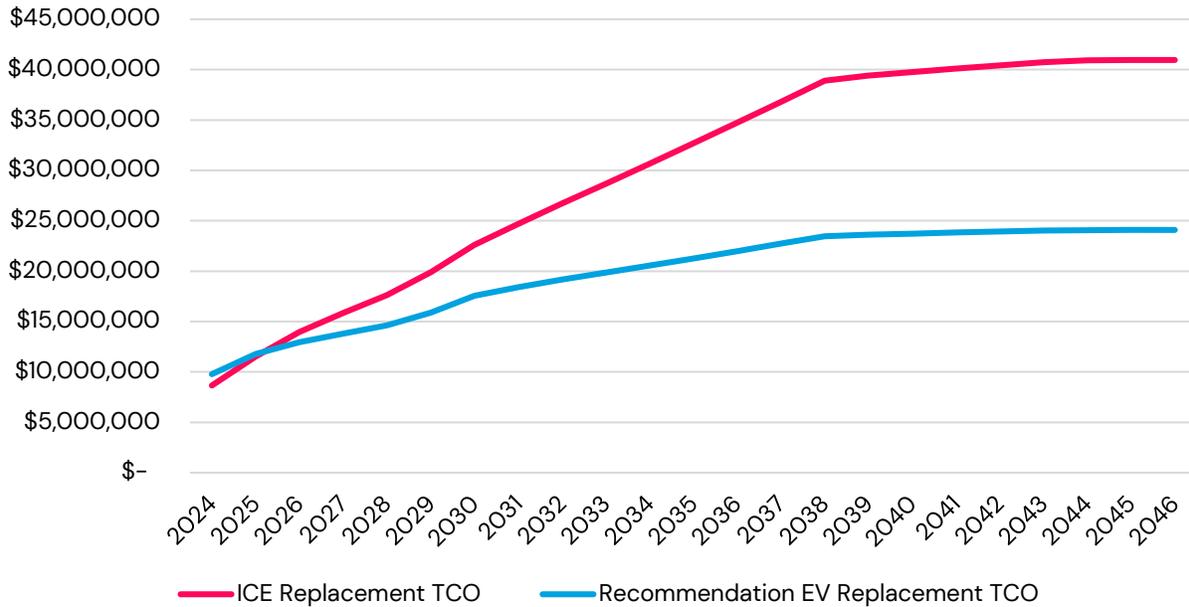
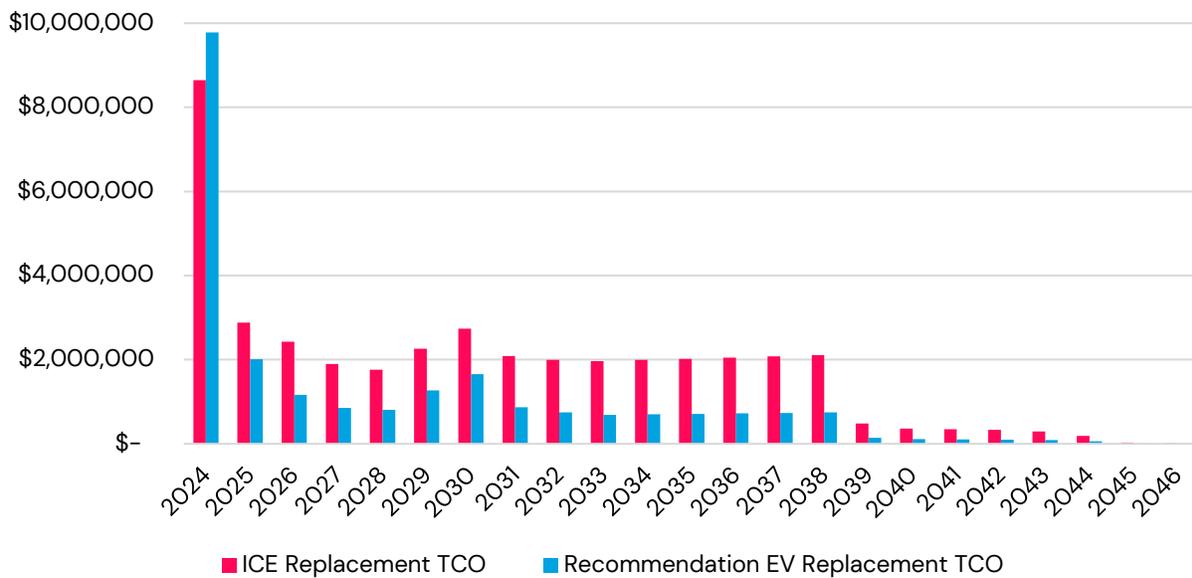


Figure 10. Annual TCO Comparison From 2024 to 2046 (Scenario 2 – 15%)



¹⁵ The TCO calculation extends through the last replacement vehicle’s lifespan. Actual replacement timeline may be significantly longer based on vehicle availability and vehicle wear and tear.

Additional Considerations

Different vehicle types are responsible for different average electrification TCO savings. While the fleet consists of a mixture of light-, medium-, and heavy-duty vehicles, due to vehicle use cases and vehicle availability, most vehicles recommended for electrification at this time are light-duty vehicles. Like medium- and heavy-duty EVs, light-duty EVs often have higher purchase prices than their ICE equivalent but, unlike medium- and heavy-duty EVs, their purchase prices are much closer to parity. This helps reduce the purchase price barrier that many fleets face due to financial constraints that prevent large upfront investments, despite promising TCO savings. Within the analyzed fleet, most vehicles are SUVs and light-duty pickups, and a majority of electrification recommendations are SUVs and light-duty pickups. Table 6 outlines the TCO savings projected for the County by vehicle type.

Table 6. TCO Savings by Vehicle Type

Vehicle Type	TCO Savings: Scenario 1	TCO Savings: Scenario 2
Sedan	\$71,671	\$127,687
SUV	\$1,116,183	\$962,839
Minivan	N/A	\$5,752
Light-Duty Pickup	\$8,665,418	\$8,731,392
Van	\$326,416	\$400,124
Medium-Duty Vocational Truck	\$18,855	\$18,855
TOTAL	\$10,198,543	\$10,246,648

If the County decides to pursue new financial incentive programs as they become available, additional vehicles and vehicle types may become financially beneficial for electrification. Moving forward, the County should continue to monitor incentive program availability to take advantage of additional electrification opportunities.

The length of the payback period can be significantly influenced by the amount of financial incentives the County pursues and wins as well as the exact EVs the County is able to acquire and the year the County acquires them. The more funding the County obtains for EVs and EVSE and the more favorable the purchase price, the shorter the payback period.

While the current analysis projects the TCO costs to break even in 2025, any delay in fleet electrification beyond 2024 will not guarantee the same results, due to changes in EV purchase prices, infrastructure costs, maintenance and training costs for employees, and more. In addition to vehicles currently recommended for electrification, those that are not are still likely to become eligible for electrification in the future. As new makes and models become available and technology develops, it is expected that later and subsequent EV purchases will be less expensive due to more accessible and affordable EV options.

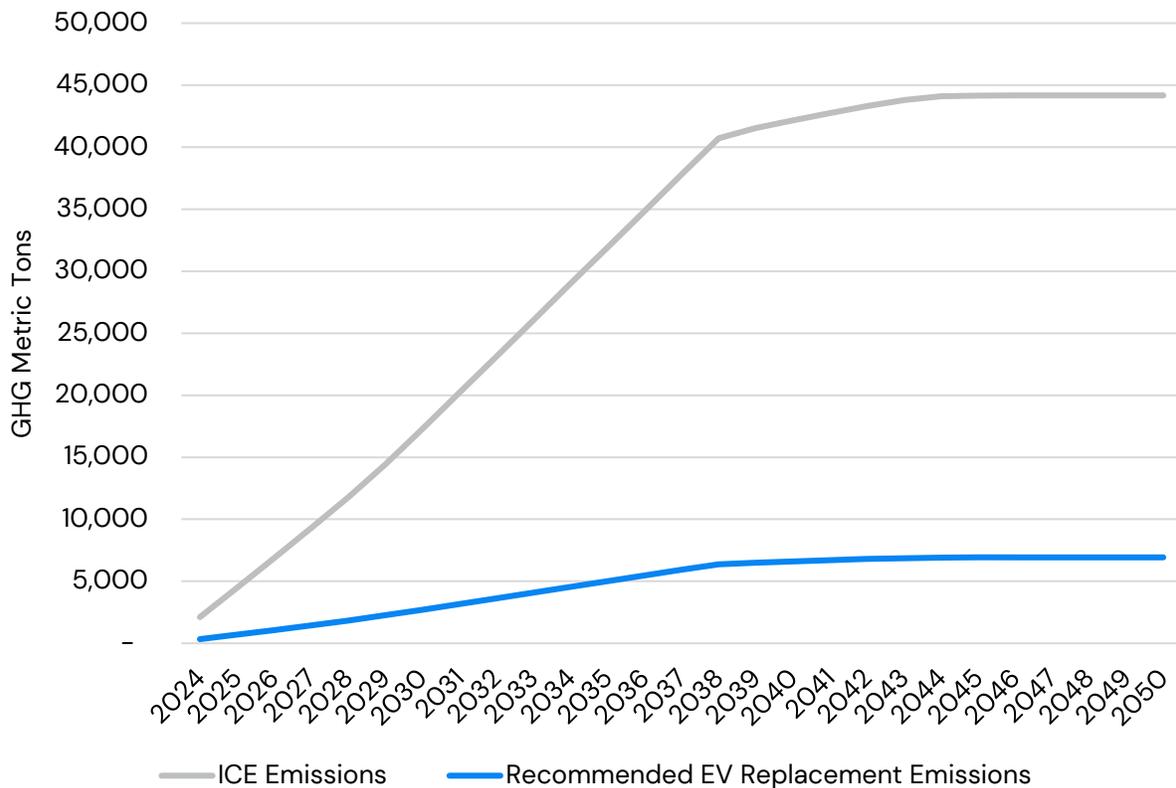
Emissions Analysis

Over the last few decades, improvements in ICE vehicle fuel economy have provided incremental vehicle emissions savings over the years. However, converting an ICE vehicle to an EV offers significant, immediate emissions savings at a much larger scale than choosing a more fuel-efficient ICE vehicle. These calculations are for wheel-to-well emissions, balancing the gasoline and diesel emissions savings with the emissions created to produce electricity, based on the County’s grid generation mix. A breakdown of projected annual GHG emissions is in Appendix C.

Scenario One

Converting 235 ICE vehicles to EVs would potentially save the County 37,243 MT of GHG emissions over the lifespan of all converted EVs, through 2046. Figure 11 shows the emissions trajectory of replacing fleet vehicles with new ICE vehicles versus with EVs. This includes factoring in petroleum fuel reductions, offset by a potential electricity consumption increase.

Figure 11. Cumulative Fleet GHG Emissions (MT)



Estimated lifetime emissions savings per vehicle type for the 235 vehicles are available below, in Table 7. Actual emissions per vehicle can vary dramatically based on the specific vehicle being replaced, average mileage, and use case.

Table 7. Lifetime Fleet Emissions by Vehicle Type

Vehicle Type	Lifetime GHG Emissions Reductions (MT)
Sedan	278
SUV	4,296
Light-Duty Pickup	31,496
Van	1,130
Medium-Duty Vocational Truck	44
TOTAL	37,243

Approximately two thirds of electrification recommendations are light-duty pickups, which account for 84% of GHG emissions savings. The remaining vehicles, which account for 36% of electrification recommendations, only account for 15% of GHG emissions savings.

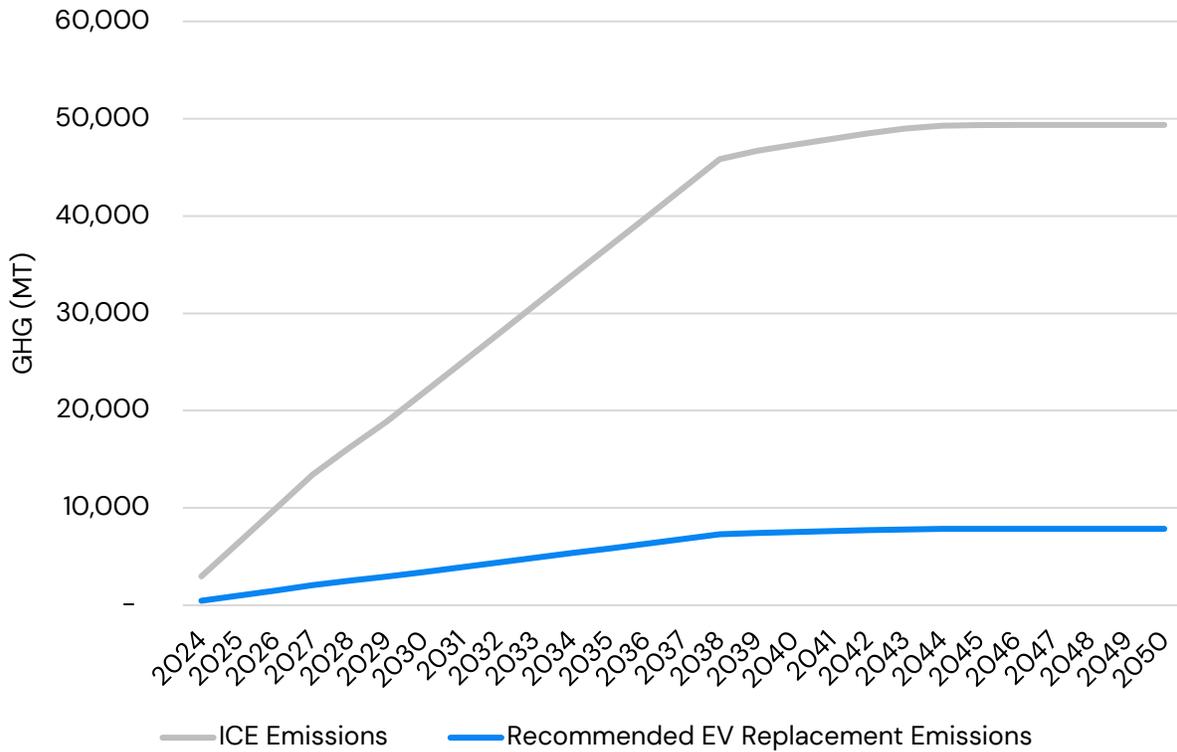
Scenario One recommendations are equivalent to:

- Removing 8,045 passenger vehicles from the road for one year
- Planting 614,517 trees
- The energy use of 4,283 homes for one year
- Switching 1,415,251 incandescent lamps to LEDs
- Recycling 12,663 tons of waste

Scenario Two

Converting 290 ICE vehicles to EVs would potentially save the County 41,377 MT of GHG emissions over the lifespan of all converted EVs, through 2046. Figure 12 shows the emissions trajectory of replacing fleet vehicles with new ICE vehicles versus with EVs. This includes factoring in petroleum fuel reductions, offset by a potential electricity consumption increase.

Figure 12. Cumulative Fleet GHG Emissions (MT)



Estimated lifetime emissions savings per vehicle type for the 290 vehicles are available below, in **Table 8. Lifetime Fleet Emissions by Vehicle Type** Table 8. Actual emissions per vehicle can vary dramatically based on the specific vehicle being replaced, average mileage, and use case.

Table 8. Lifetime Fleet Emissions by Vehicle Type

Vehicle Type	Lifetime GHG Emissions Reductions (MT)
Sedan	444
SUV	7,722
Minivan	107
Light-Duty Pickup	31,563
Van	1,496
Medium-Duty Vocational Truck	44
TOTAL	41,377

Half of electrification recommendations are light-duty pickups, which account for 76% of GHG emissions savings. Almost one third of recommendations are SUVs, which account for 19% of GHG emissions savings. The remaining vehicles represent 16% of electrification recommendation and account for 5% of GHG emissions savings.

These recommendations are equivalent to:

- Removing 8,937 passenger vehicles from the road for one year
- Planting 682,714 trees
- The energy use of 4,758 homes for one year
- Switching 1,572,311 incandescent lamps to LEDs
- Recycling 14,068 tons of waste

EVSE Needs Assessment Overview

For the electrification assessment, basic infrastructure planning cost considerations were incorporated into the calculations and recommendations. This assessment assumes that the County will be able to assign four vehicles per EVSE for both Level 2 and DCFC. Depending on vehicle duty cycle and application, charger level and the number of vehicles per plug may need to be adjusted. For example, if vehicles are fully rotated throughout the day, less plugs may be needed. However, more plugs may be needed for vehicles on the same duty cycle and need to charge simultaneously. Similarly, if some vehicles have higher daily mileage than others, the County may need to install more DCFC or develop a charging schedule that would identify efficiencies and reduce the number of plugs needed. Additional DCFC or a detailed charging schedule may be necessary to support electric police vehicles due to their domiciled status and demanding use case.

As of February 2023, the County has 17 Level 2 EVSE installed, totaling 34 ports for fleet-only use. An additional 7 fleet-only Level 2 EVSE, totaling 14 ports, are planned for deployment in later 2023. Table 9 shows a breakdown of existing and planned Level 2 EVSE for fleet-use only.

Table 9. Existing and Planned County Fleet Level 2 EVSE

Status	Location	Address	City	Number of EVSE	Ports Available
Installed	Cooksville Highways Shop	14212 Frederick RD	Cooksville	1	2
	Central Fleet (Ridge Road)	8800 Ridge Road	Ellicott City	2	4
	Riverwood (Facilities)	7125 Riverwood Dr	Columbia	2	4
	Berger Road	9200 Berger Road	Columbia	2	4
	George Howard Building	3430 Court House Drive	Ellicott City	4	8
	New Courthouse	9250 Judicial Way	Ellicott City	3	6
	New Courthouse	9250 Judicial Way	Ellicott City	3	6

Planned	Ascend One	8930 Stanford Blvd	Columbia	1	2
	Corrections/Detention Center	7301 Waterloo Rd	Jessup	1	2
	Recreation and Parks Headquarters	7120 Oakland Mills Road	Columbia	2	4
	Utilities Building	8270 Old Montgomery Road	Columbia	2	4
	Gateway	6751 Columbia Gateway Drive	Columbia	1	2

The County also owns several publicly accessible EVSE that may be used for short-term charging needs. However, if the County uses publicly accessible chargers, they cannot expect regular availability or a reliable charging schedule. Similarly, the County could utilize other non-government owned public chargers for urgent, short-term needs, but they will pay commercial rates, reducing fuel cost saving opportunities.

Table 10 provides a preliminary estimation of charging infrastructure needed to support the EV recommendations in this assessment. These preliminary recommendations may serve as a potential guide to help the County strategically plan EVSE needs and installation.¹⁶ This fleet electrification analysis does not include a complete EVSE needs and siting assessment, and the County should complete a detailed siting assessment before deploying EVSE at a large scale. Vehicle charging needs should be further explored by the County before widescale electrification occurs.¹⁷ Appendix D provides an overview of EVSE types and a breakdown of how to assess EVSE needs.

Table 10. EVSE Considerations by Charger Type

Scenario	Charger Type	Number of EVSE Needed	Vehicle Types Supported
Scenario 1	Level 2	58	Sedan, SUV, Light-Duty Pickup, Van, Medium-Duty Vocational Truck
	DCFC	1	SUV, Light-Duty Pickup
Scenario 2	Level 2	65	Sedan, SUV, Minivan, Light-Duty Pickup, Van, Medium-Duty Vocational Truck
	DCFC	8	SUV, Light-Duty Pickup

Several vehicles recommended for electrification are located at buildings already equipped with Level 2 EVSE. These vehicles are identified in Table 11.

¹⁶ Table 10 offers projected Level 2 and DCFC EVSE needs based on current model assumptions and number of vehicles recommended for electrification.

¹⁷ See the DOE Alternative Fuels Data Center for more information about [Charging Infrastructure Procurement and Installation](#), including average costs.

Table 11. EV Recommendations at Locations Already Equipped with Level 2 EVSE

Address	Vehicle Type	Number of Vehicles Recommended for Electrification (Scenario 1)	Number of Vehicles Recommended for Electrification (Scenario 2)
14212 Frederick Road	SUV, Light-Duty Pickup	5	5
3430 Court House Drive	SUV	1	1
7125 Riverwood Drive	SUV, Light-Duty Pickup, Sedan	38	39
8800 Ridge Road	Light-Duty Pickup	1	1
9200 Berger Road	SUV, Light-Duty Pickup, Van	22	23
9250 Judicial Way	Sedan, Light-Duty Pickup	2	2

While these locations do not currently have the capacity to support existing fleet EVs and all EV recommendations, the County may be able to prioritize infrastructure development at these locations, especially if the site has been futureproofed¹⁸ to easily expand and accommodate a growing EV fleet. Appendix B breaks down all vehicle recommendations individually by base site name.

As the County begins electrifying vehicles on a larger scale and planning EVSE installations, it should assess the fleet’s current and future charging needs. Recommendations on how to futureproof charging infrastructure include:

- Evaluating short- and long-term EVSE needs based on current fleet makeup and future fleet makeup, based preliminarily on this assessment
- Identifying location(s) that may be used as a hub for DCFC stations to reduce the number of construction sites or identify an existing DCFC that the fleet may use for fast charging (e.g., establishing a hub for police patrol vehicles)
- Tallying the number of existing parking spaces at each location with EV recommendations
- Examining the existing electrical capacity and infrastructure at vehicle base sites to determine if the location can support the installation of and use of EVSE without infrastructure upgrades
- Determining the number of parking spaces that will require infrastructure upgrades to support EVSE

¹⁸ Pre-wiring and electrical capacity are already in place or upgraded to support more EVSE than are currently installed at a location. This helps ensure fleets can preemptively meet growing charging demand at a more cost-effective rate.

- Developing plans for EVSE design, construction, and installation. These plans may include: panel upgrades, electrical capacity upgrades, utility-side infrastructure upgrades, trenching for electrical conduit, etc.
- Standardizing EVSE siting design (e.g., signage,¹⁹ accessibility,²⁰ use requirements, parking space design, Americans with Disabilities Act requirements,²¹ etc.) and permitting
- Adopting building codes²² that require pre-wiring compatible with EVSE installation on government property with considerations for existing and new buildings

Additional Best Practices and Considerations

Police Vehicle Charging Infrastructure Considerations

Police vehicles represent a more challenging charging scenario for the County because the vehicles are domiciled at officers' homes and the County does not have an at-home charging policy. Without the ability to charge overnight at home, police vehicles will need to charge during the day while on duty. The County will need to develop alternative charging options or adopt an at-home charging policy.

To address police charging needs, the County should take a closer look at the use cases for each vehicle and determine how many hours each police vehicle is on patrol versus parked at the Police Department. Vehicles that are driven to the station and parked for the day should be prioritized for electrification first, as their charging needs will be fulfilled primarily by Level 2 EVSE and likely easier to accommodate in the short-term.

Police vehicles that are driven, or are on patrol, for most working hours will need access to DCFC stations. DCFC will allow patrol vehicles to charge up quickly in the morning, during breaks, or at the end of the workday. Installing DCFC will require a larger upfront investment from the County but will provide officers with more optimal charging speeds until an at-home charging policy is in place. The County is primarily interested in long-range police EVs, and this assessment only evaluated those types of police vehicles. Long-range police EVs, while slightly more expensive to purchase, will help reduce the frequency of charging trips and driver range anxiety.

Developing a policy that allows at-home EV charging will help the County provide more charging opportunities for domiciled vehicles, reducing the dependence and need for DCFC stations for police patrol vehicles. The policy should include considerations for:

¹⁹ DOE. 2023. "Signage for PEV Charging Stations." Retrieved from:

https://afdc.energy.gov/fuels/electricity_charging_station_signage.html

²⁰ California PEV Collaborative. 2012. "Accessibility and Signage for PEV Charging Infrastructure." Retrieved from"

https://www.calbo.org/sites/main/files/file-attachments/ca_accessibility_for_ev_charging.pdf?1524861081

²¹ DOE. 2014. "Guidance in Complying with ADA Requirements." Retrieved from:

https://afdc.energy.gov/files/u/publication/WPCC_complyingwithADArequirements_1114.pdf

²² International Code Council. 2019. "Proposed Changes to the 2019 International Codes." Retrieved from:

<media.iccsafe.org/code-development/group-b/2019-Group-B-CAH-compressed.pdf>

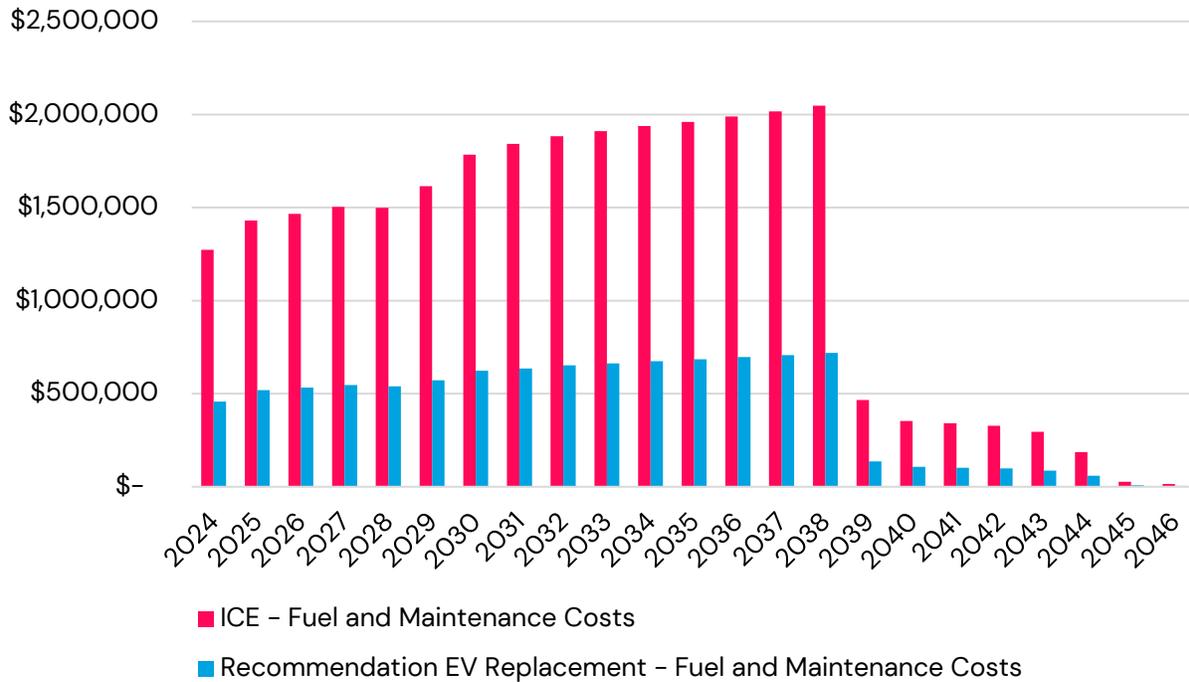
- Whether the County will support Level 1 and Level 2 charging at employee homes
- Wiring, capacity, submeters, or other electrical upgrades necessary to support EVSE at an employee home and whether the County will cover expenses
- The cost to purchase, install, and maintain EVSE at employee homes and payment or reimbursement models
- The cost of electricity to charge EVs at employee homes and payment or reimbursement models
- EVSE ownership models

Despite the current charging limitations, this report includes police vehicles in the assessment to demonstrate that electric police vehicles offer TCO savings. After the County conducts a more extensive review of police vehicles and EVSE siting requirements, the County may choose to delay police vehicle electrification until an at-home charging policy or a charging schedule for DCFC stations is developed. If the County delays electrifying police vehicles, the County should expect a larger number of electric police vehicles to be available and more opportunities for cost savings as the EV market continues to mature. Similarly, the County should monitor new police EV model range specifications to see if more affordable models that meet fleet needs become available.

Vehicle Maintenance Costs

The County is particularly concerned about vehicle durability and maintenance and repair costs. Generally, compared to ICE vehicles, EVs have lower maintenance costs as they do not require routine maintenance including oil, filter, and timing belt changes. Similarly, EV battery, motor, and associated electric systems require little maintenance; brake wear is reduced due to regenerative braking; and there are fewer moving parts compared to an ICE vehicle, reducing the opportunities for damage. Figure 13 provides an overview of the savings opportunities that the Scenario One electrification recommendations offer. These projections are based on a combination of fleet data and assumptions, actual savings may vary. The County should consider separately evaluating existing fleet EV maintenance and repair costs over vehicle lifespans to identify any unexpected costs or specific use cases that trigger above average maintenance costs.

Figure 13. Assessment Fuel and Maintenance Annual Costs



Vehicle Availability

The County fleet has many vehicles that are not currently recommended for electrification for reasons other than TCO. This is either due to vehicle capabilities that are not yet available in certain vehicle classes and use cases, or a lack of vehicle models and vendors that sell and support the vehicles. In the case of the County’s heavy trucks, the vehicles need to be both plow- and dump-capable, but the EV market does not yet offer a vehicle that will meet the use case of these fleet vehicles. In this case, the County may find other alternative fuels useful for achieving GHG emissions reductions until EV models are available. For heavy diesel trucks, biodiesel may be particularly useful. Biodiesel blends of 20% or lower can be “dropped in” to diesel vehicles without engine modifications and can reduce emissions by approximately 15% per vehicle.²³ In the case of the County’s medium-duty pickups, recent market changes have limited their availability.²⁴ Medium-duty pickups are available through commercial electrification customization manufacturers, but the availability of local vendor and repair support for these vehicles presents a barrier for short-term adoption. The County should monitor market development for manufacturer announcements of medium-duty pickups and heavy trucks that are plow- and dump-capable.

²³ DOE. 2011. “Biodiesel Basics.” Retrieved from: <https://www.nrel.gov/docs/fy11osti/47504.pdf>

²⁴ Atlys Motor Vehicles and XL Fleet stopped EV production in 2023.

Staff Training Resources

EVs require less maintenance than ICE vehicles, but they often involve new skills, knowledge, and techniques. To ensure the fleet maintenance staff and technicians receive adequate training on EV and EVSE maintenance, the County fleet manager should hold a mandatory training for all mechanics and consider providing additional learning opportunities throughout the year. Training and educational resources for fleet mechanics include:

- The National Alternative Fuels Training Consortium [Electric Drive Vehicle Automotive Technician Training](#). This teaches participants the difference between EV and ICE vehicle operation and appropriate maintenance techniques.
- The [Electric Vehicle Infrastructure Training Program](#) for EVSE provides certification for electricians on, among other things, EV battery types and specifications, service-level assessments and upgrade implementation, and utility interconnection policies and requirements. To be eligible for EVITP, a participant must be a State licensed or certified electrician or if the participant works in a States that does not license or certify electricians, the participant must provide documentation of a minimum of 8,000 hours of hands-on electrical construction experience.
- The Federal Energy Management Program’s [fleet management training courses](#). This resource offers training for EV technology, EVSE power and installation requirements, EVSE site assessments, and site operations.
- The DOE’s [EV Training](#) website.
- The Clean Tech Institute’s [Certified EV Technician Training Program](#), which provides training for EV repair and maintenance.

Along with the cost of vehicle acquisition, range anxiety can present barriers to EV drivers. To familiarize staff in charge of operating and maintaining EVs and EVSE, the County can use the following EV resources, among others, to develop educational materials:

- [Maryland EV](#)
- DOE Alternative Fuels Data Center’s [Electricity Basics](#)
- DOE Alternative Fuels Data Center’s [Developing Infrastructure to Charge PEVs](#)
- DOE’s [Electric-Drive Vehicles](#) report
- DOE’s [fueleconomy.gov](#) website for all vehicle models available
- CALSTART’s [Zero-Emission Technology Inventory](#) tool
- National Alternative Fuels Training Consortium’s [Electric Drive Vehicle Automotive Technician Training](#)

Finally, in addition to EV maintenance, the County will need to develop EVSE maintenance policies. In developing them, the County should consider the following practices:

- Evaluate the EVSE OEM’s maintenance and support packages and the availability of local service options.
- Develop a service agreement that outlines who (Howard County, the manufacturer, etc.) will perform EVSE maintenance both during and after the warranty period.
- Establish a schedule for the routine inspection and maintenance of EVSE to ensure high up-time (i.e., the percentage of time the EVSE is fully operational).
- Have both electrical and non-electrical maintenance staff available for servicing EVSE, as not all maintenance is electrical.
- Consider extended warranties for Level 2 and DCFC EVSE.

Conclusion

This analysis identifies up to 290 vehicles for electrification of the County’s fleet, with electrification beginning in 2024. If the County follows the recommended replacement schedule for transitioning from ICE vehicles to EVs, the County can expect to see financial savings following 2025 and a reduction in GHG emissions up to 41,377 MT. Electrification offers Howard County the opportunity to meet their goals and improve the fleet’s impact on the community and environment. For simpler, future electrification TCO assessments, the County may utilize AFLEET for quick cost and emissions calculations, see Appendix E.

Appendices

Appendix A. Assumptions and Calculations

Key assumptions and data sources that were used in this analysis include the following:

- **Recommendation Threshold:** The County opted to evaluate two scenarios:
 - EVs are recommended only when the EV TCO is 0% of the TCO of the comparable ICE vehicle
 - EVs are recommended only when the EV TCO is up to 15% more than the TCO of the comparable ICE vehicle
- **Vehicle Pricing:** The model uses manufacturer suggested retail prices (MSRPs) for EVs where available. When MSRP pricing is unavailable, the model uses average pricing based on vehicle and fuel type based on [Argonne National Laboratory's Alternative Fuel Life Cycle Environmental and Economic Transportation \(AFLEET\) Tool](#) and ICF's [Comparison of Medium- and Heavy-Duty Technologies in California](#) report for the California Electric Transportation Coalition. Vehicle pricing was escalated annually using the [U.S. Energy Information Administration's \(EIA\) 2020 Annual Energy Outlook \(AEO\)](#) and ICF's [Comparison of Medium- and Heavy-Duty Technologies in California](#) report for the California Electric Transportation Coalition. Vehicle pricing assumptions do not automatically include financial incentives. Incentives are separately applied to vehicle costs if they are included in assessment scenarios.
- **Current Mileage:** The County provided vehicle mileage from odometer readings in their application package.
- **Annual Mileage:** The County provided annual vehicle mileage.
- **Fuel Costs:** The existing fleet fuel costs were estimated using the vehicles' annual mileage, fleet fuel economy data, and base fuel prices per gallon. The model uses fuel prices provided by the County for diesel and gasoline. Prices were set at: \$3.99 per gallon of diesel and \$3.45 per gallon of gasoline. The model escalates gasoline and diesel pricing annually using projections from the [U.S. EIA's 2022 AEO Reference Case for Transportation](#). This is the only price escalation scenario considered in this assessment.
- **Maintenance Costs:** Existing fleet maintenance costs were provided by the County. Maintenance costs were escalated 2.2% annually. Additional maintenance savings for EVs may be realized over time, however an initial capital outlay is needed to train maintenance staff and adjust operations to handle EVs.
- **Electricity Pricing:** The model uses \$0.10 per kWh, as provided by the County.
- **Timeframe:** The County set 2024 as the start year for electrification.
- **Discount Rate:** 5% was used for net present value calculations.

- **Temperatures:** Utilized the average annual temperatures to calculate the impact on battery performance and reduced battery range.
- **Emissions Factor:** The assessment uses eGRID Region emissions factors, set to RFCE.
- **Police Vehicles:** The County requested only long-range models be evaluated.
- **Heavy Trucks:** These vehicles must be dump- and plow-capable.

Appendix B. Electrification Assessment Results and Recommendations

Scenario One

Vehicle Type	Make	Model	Year	Retirement Year	Base Site Name	Replacement Make/Model
SUV	CHEVROLET	TRAILBLAZER	2007	2024	Utilities-Water Reclamation	Chevrolet – Equinox EV 1LT
SUV	CHEVROLET	TRAILBLAZER	2007	2024	Office of Central Services Adm	Chevrolet – Equinox EV 1LT
SUV	FORD MOTOR CO	ESCAPE	2013	2024	Utilities – Administration	Kia – Niro Plug-in Hybrid SUV
SUV	FORD MOTOR CO	ESCAPE	2014	2024	Facilities – Maintenance Adm	Chevrolet – Equinox EV 1LT
SUV	FORD MOTOR CO	ESCAPE	2014	2024	Environmental-Stormwater Mgmt	Kia – Niro Plug-in Hybrid SUV
SUV	FORD MOTOR CO	ESCAPE	2014	2024	Utilities-Water Reclamation	Chevrolet – Equinox EV 1LT
SUV	FORD MOTOR CO	ESCAPE	2015	2024	Cap. Projects Bureau, Construction, HQ	Chevrolet – Equinox EV 1LT
SUV	FORD MOTOR CO	ESCAPE SE	2015	2024	Public Works-Director's Office	Chevrolet – Equinox EV 1LT
SUV	FORD MOTOR CO	ESCAPE	2015	2024	Facilities – Maintenance Adm	Chevrolet – Equinox EV 1LT
SUV	FORD MOTOR CO	ESCAPE	2015	2024	Facilities – Maintenance Adm	Chevrolet – Equinox EV 1LT
SUV	FORD MOTOR CO	ESCAPE	2015	2024	Facilities – Maintenance Adm	Chevrolet – Equinox EV 1LT
SUV	FORD MOTOR CO	ESCAPE	2015	2024	Fire & Rescue-Logistics	Chevrolet – Equinox EV 1LT
SUV	FORD MOTOR CO	ESCAPE SE	2016	2024	Utilities-Water Reclamation	Kia – Niro Plug-in Hybrid SUV
SUV	FORD MOTOR CO	ESCAPE SE	2016	2024	Facilities – Maintenance Adm	Chevrolet – Equinox EV 1LT
SUV	FORD MOTOR CO	ESCAPE	2017	2024	Housing and Community Develop	Kia – Niro Plug-in Hybrid SUV
SUV	FORD MOTOR CO	ESCAPE	2016	2024	Eng Construction Inspection Div	Kia – Niro Plug-in Hybrid SUV
SUV	FORD MOTOR CO	ESCAPE SE	2017	2024	Rec and Parks Directors Office	Chevrolet – Equinox EV 1LT
SUV	FORD MOTOR CO	ESCAPE TITANIUM	2016	2024	Citizens Svcs-Administration	Chevrolet – Equinox EV 1LT
SUV	FORD MOTOR CO	ESCAPE SE	2017	2024	Inspect-Lic-Permits-Adm	Kia – Niro Plug-in Hybrid SUV
SUV	FORD MOTOR CO	ESCAPE SE	2017	2024	Inspect-Lic-Permits-Adm	Chevrolet – Equinox EV 1LT
SUV	FORD MOTOR CO	ESCAPE SE	2017	2027	Inspect-Lic-Permits-Adm	Kia – Niro Plug-in Hybrid SUV

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Vehicle Type	Make	Model	Year	Retirement Year	Base Site Name	Replacement Make/Model
SUV	FORD MOTOR CO	ESCAPE SE	2017	2027	Inspect-Lic-Permits-Adm	Kia – Niro Plug-in Hybrid SUV
SUV	FORD MOTOR CO	ESCAPE SE	2017	2025	Facilities – Maintenance Adm	Chevrolet – Equinox EV 1LT
SUV	FORD MOTOR CO	ESCAPE	2017	2025	Highways – Administration	Kia – Niro Plug-in Hybrid SUV
SUV	FORD MOTOR CO	ESCAPE	2017	2025	Highways – Administration	Chevrolet – Equinox EV 1LT
SUV	FORD MOTOR CO	ESCAPE	2017	2025	Office of Risk Management Adm	Chevrolet – Equinox EV 1LT
SUV	FORD MOTOR CO	ESCAPE	2017	2025	Planning & Zoning– Directors	Kia – Niro Plug-in Hybrid SUV
SUV	FORD MOTOR CO	ESCAPE	2017	2026	Highways – Administration	Chevrolet – Equinox EV 1LT
SUV	FORD MOTOR CO	ESCAPE	2018	2026	Tech/Comm – WAN	Kia – Niro Plug-in Hybrid SUV
SUV	FORD MOTOR CO	ESCAPE SE	2017	2027	Rec and Parks Directors Office	Chevrolet – Equinox EV 1LT
SUV	FORD MOTOR CO	ESCAPE	2017	2026	Utilities – Administration	Kia – Niro Plug-in Hybrid SUV
SUV	FORD MOTOR CO	ESCAPE SE	2018	2028	DPW – Traffic Engineering Div	Chevrolet – Equinox EV 1LT
SUV	FORD MOTOR CO	ESCAPE SE	2018	2028	DPW – Traffic Engineering Div	Chevrolet – Equinox EV 1LT
SUV	FORD MOTOR CO	ESCAPE SE	2018	2029	Inspect-Lic-Permits-Adm	Chevrolet – Equinox EV 1LT
SUV	FORD MOTOR CO	ESCAPE SE	2018	2032	Inspect-Lic-Permits-Adm	Chevrolet – Equinox EV 1LT
SUV	FORD MOTOR CO	ESCAPE SE	2018	2032	Inspect-Lic-Permits-Adm	Chevrolet – Equinox EV 1LT
SUV	FORD MOTOR CO	ESCAPE SE	2018	2029	Inspect-Lic-Permits-Adm	Chevrolet – Equinox EV 1LT
SUV	FORD MOTOR CO	ESCAPE SE	2018	2028	Facilities – Maintenance Adm	Chevrolet – Equinox EV 1LT
SUV	FORD MOTOR CO	ESCAPE SE	2018	2028	Office of Corrections– Adm	Chevrolet – Equinox EV 1LT
SUV	FORD MOTOR CO	ESCAPE SE	2018	2028	Office of Corrections– Adm	Chevrolet – Equinox EV 1LT
SUV	FORD MOTOR CO	ESCAPE SE	2018	2028	Office of Corrections– Adm	Kia – Niro Plug-in Hybrid SUV
SUV	FORD MOTOR CO	ESCAPE SE	2018	2029	Natural Resources, Forestry, HQ	Chevrolet – Equinox EV 1LT
SUV	FORD MOTOR CO	ESCAPE SE	2018	2029	Natural Resources, Forestry, HQ	Kia – Niro Plug-in Hybrid SUV
SUV	FORD MOTOR CO	ESCAPE SE	2019	2029	Natural Resources, Forestry, HQ	Chevrolet – Equinox EV 1LT
SUV	FORD MOTOR CO	ESCAPE SE	2019	2029	Utilities – Administration	Kia – Niro Plug-in Hybrid SUV
SUV	FORD MOTOR CO	ESCAPE SE	2019	2029	Utilities – Administration	Kia – Niro Plug-in Hybrid SUV

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Vehicle Type	Make	Model	Year	Retirement Year	Base Site Name	Replacement Make/Model
SUV	FORD MOTOR CO	ESCAPE SE	2019	2030	Rec and Parks Directors Office	Kia – Niro Plug-in Hybrid SUV
SUV	FORD MOTOR CO	ESCAPE SE	2019	2028	Office of Central Services Adm	Chevrolet – Equinox EV 1LT
SUV	FORD MOTOR CO	ESCAPE SE HYBRID	2020	2031	Rec and Parks Directors Office	Kia – Niro Plug-in Hybrid SUV
SUV	FORD MOTOR CO	ESCAPE	2021	2029	Eng Construction Inspection Div	Kia – Niro Plug-in Hybrid SUV
SUV	FORD MOTOR CO	ESCAPE SE HYBRID	2021	2030	Dept. Technology/Comm Svcs Adm	Kia – Niro Plug-in Hybrid SUV
SUV	FORD MOTOR CO	ESCAPE	2015	2024	Fire & Rescue-Logistics	Chevrolet – Equinox EV 1LT
SUV	FORD MOTOR CO	ESCAPE	2015	2024	Fire & Rescue-Logistics	Chevrolet – Equinox EV 1LT
SUV	CHEVROLET	1AT46 HHR	2011	2024	Fire & Rescue-Logistics	Kia – Niro Plug-in Hybrid SUV
SUV	FORD MOTOR CO	ESCAPE	2013	2024	Fire & Rescue-Logistics	Kia – Niro Plug-in Hybrid SUV
SUV	FORD MOTOR CO	ESCAPE SE	2013	2024	Fire & Rescue-Logistics	Kia – Niro Plug-in Hybrid SUV
SUV	FORD MOTOR CO	ESCAPE SE U9G7	2017	2024	Fire & Rescue-Logistics	Kia – Niro Plug-in Hybrid SUV
Sedan	CHEVROLET	IMPALA	2009	2024	State's Attorney-Admin	Nissan – Leaf S
Sedan	CHEVROLET	MALIBU	2014	2024	Utilities - Administration	Nissan – Leaf S
Sedan	CHEVROLET	MALIBU	2015	2024	Inspect-Lic-Permits-Adm	Nissan – Leaf S
SUV	SUBARU	XV CROSSTREK HYBRID	2015	2024	Utilities-Water Reclamation	Kia – Niro Plug-in Hybrid SUV
SUV	SUBARU	XV CROSSTREK HYBRID	2016	2024	Environmental-Operations	Chevrolet – Equinox EV 1LT
SUV	SUBARU	CROSSTREK HYBRID	2016	2024	Facilities - Maintenance Adm	Kia – Niro Plug-in Hybrid SUV
SUV	SUBARU	CROSSTREK HYBRID	2016	2024	Highways - Administration	Chevrolet – Equinox EV 1LT
SUV	SUBARU	CROSSTREK HYBRID	2016	2024	Facilities - Maintenance Adm	Chevrolet – Equinox EV 1LT
Sedan	HONDA	ACCORD	2014	2024	Fire & Rescue-Logistics	Nissan – Leaf S
Sedan	FORD MOTOR CO	FOCUS	2014	2024	Health Dept County Funding Adm	Nissan – Leaf S
Sedan	FORD MOTOR CO	FOCUS	2015	2024	Health Dept County Funding Adm	Nissan – Leaf S
Sedan	FORD MOTOR CO	FOCUS	2016	2024	Health Dept County Funding Adm	Nissan – Leaf S
Sedan	FORD MOTOR CO	FOCUS	2016	2024	Health Dept County Funding Adm	Nissan – Leaf S
SUV	FORD MOTOR CO	EXPLORER POLICE UTL	2019	2025	Police-Management Svc Bureau	Ford – Mustang Mach-E Premium RWD Extended Range (Police)

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Vehicle Type	Make	Model	Year	Retirement Year	Base Site Name	Replacement Make/Model
Light-Duty Pickup	FORD MOTOR CO	F150	2009	2024	Utilities – Administration	Chevrolet – Silverado EV
Light-Duty Pickup	CHEVROLET	SILVERADO 1500	2010	2024	Utilities-Water Reclamation	Chevrolet – Silverado EV
Light-Duty Pickup	FORD MOTOR CO	F150 XL	2011	2024	Parks, Park Ops, Z3, Schooley Mill Pk.	Chevrolet – Silverado EV
Light-Duty Pickup	FORD MOTOR CO	F150 XL	2011	2024	Natural Res, Robinson Nature Center	Chevrolet – Silverado EV
Light-Duty Pickup	FORD MOTOR CO	F150 XL	2012	2024	Parks, Park Ops, Z4, Rockburn Park	Chevrolet – Silverado EV
Light-Duty Pickup	CHEVROLET	1500	2014	2024	Highways- Maintenance-Central-Dayton	Chevrolet – Silverado EV
Light-Duty Pickup	CHEVROLET	1500	2014	2024	Highways- Maintenance-West-Cooksville	Chevrolet – Silverado EV
Light-Duty Pickup	CHEVROLET	SILVERADO 1500	2014	2024	Highways – Administration	Chevrolet – Silverado EV
Light-Duty Pickup	FORD MOTOR CO	F150 XL	2014	2024	Tech/Comm – Help Desk	Chevrolet – Silverado EV
Light-Duty Pickup	FORD MOTOR CO	F150 XLT	2014	2024	Environmental-Operations	Chevrolet – Silverado EV
Light-Duty Pickup	FORD MOTOR CO	F150	2016	2024	Environmental-Operations	Chevrolet – Silverado EV
Light-Duty Pickup	FORD MOTOR CO	F150	2016	2024	Environmental-Operations	Chevrolet – Silverado EV
Light-Duty Pickup	FORD MOTOR CO	F150	2017	2024	Environmental-Operations	Chevrolet – Silverado EV
Light-Duty Pickup	FORD MOTOR CO	F150	2018	2024	Utilities – Administration	Chevrolet – Silverado EV
Light-Duty Pickup	FORD MOTOR CO	F150	2018	2024	Utilities – Administration	Chevrolet – Silverado EV
Light-Duty Pickup	FORD MOTOR CO	F150	2018	2024	Parks, Park Ops, Z2, Centennial Park	Chevrolet – Silverado EV
Light-Duty Pickup	FORD MOTOR CO	F150	2018	2024	Parks, Park Ops, Z3, Western Regional Pk	Chevrolet – Silverado EV
Light-Duty Pickup	FORD MOTOR CO	F150	2018	2024	Environmental-Operations	Chevrolet – Silverado EV
Light-Duty Pickup	FORD MOTOR CO	F150	2018	2024	Environmental-Operations	Chevrolet – Silverado EV
Light-Duty Pickup	FORD MOTOR CO	F150	2019	2024	Utilities – Administration	Chevrolet – Silverado EV
Light-Duty Pickup	FORD MOTOR CO	F150	2021	2024	Facilities – Maintenance Adm	Chevrolet – Silverado EV
Light-Duty Pickup	FORD MOTOR CO	F150	2021	2024	Facilities – Maintenance Adm	Chevrolet – Silverado EV
Light-Duty Pickup	FORD MOTOR CO	F150	2021	2029	Environmental-Operations	Chevrolet – Silverado EV
Light-Duty Pickup	FORD MOTOR CO	F150	2021	2029	Parks, Park Ops, Z4, Rockburn Park	Chevrolet – Silverado EV
Light-Duty Pickup	FORD MOTOR CO	F150	2021	2030	Environmental-Operations	Chevrolet – Silverado EV

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Vehicle Type	Make	Model	Year	Retirement Year	Base Site Name	Replacement Make/Model
Light-Duty Pickup	FORD MOTOR CO	F150	2021	2031	Parks, Park Ops, Z2, Centennial Park	Chevrolet – Silverado EV
Light-Duty Pickup	CHEVROLET	SILVERADO	2008	2024	Fire & Rescue-Logistics	Chevrolet – Silverado EV
Light-Duty Pickup	CHEVROLET	SILVERADO	2008	2024	Fire & Rescue-Logistics	Chevrolet – Silverado EV
Light-Duty Pickup	FORD MOTOR CO	F150	2013	2024	Fire & Rescue-Logistics	Chevrolet – Silverado EV
Light-Duty Pickup	CHEVROLET	SILVERADO	2019	2024	Fire & Rescue-Logistics	Chevrolet – Silverado EV
Light-Duty Pickup	CHEVROLET	1500	2014	2024	Natural Resources, Ranger, HQ-Annex	Chevrolet – Silverado EV
Light-Duty Pickup	FORD MOTOR CO	F150	2016	2024	Eng Construction Inspection Div	Chevrolet – Silverado EV
Light-Duty Pickup	FORD MOTOR CO	F150	2016	2024	Eng Construction Inspection Div	Chevrolet – Silverado EV
Light-Duty Pickup	FORD MOTOR CO	F150 XL	2016	2024	Parks, Park Ops, Z3, Schooley Mill Pk.	Chevrolet – Silverado EV
Light-Duty Pickup	FORD MOTOR CO	F150	2017	2024	Highways-Maintenance-East-Mayfield	Chevrolet – Silverado EV
Light-Duty Pickup	FORD MOTOR CO	F150	2017	2024	Eng Construction Inspection Div	Chevrolet – Silverado EV
Light-Duty Pickup	FORD MOTOR CO	F150	2017	2024	Eng Construction Inspection Div	Chevrolet – Silverado EV
Light-Duty Pickup	FORD MOTOR CO	F150	2017	2024	Eng Construction Inspection Div	Chevrolet – Silverado EV
Light-Duty Pickup	FORD MOTOR CO	F150	2017	2024	Eng Construction Inspection Div	Chevrolet – Silverado EV
Light-Duty Pickup	FORD MOTOR CO	F150	2017	2024	Eng Construction Inspection Div	Chevrolet – Silverado EV
Light-Duty Pickup	FORD MOTOR CO	F150	2017	2024	Utilities – Administration	Chevrolet – Silverado EV
Light-Duty Pickup	FORD MOTOR CO	F150	2017	2024	Utilities – Administration	Chevrolet – Silverado EV
Light-Duty Pickup	FORD MOTOR CO	F150	2017	2024	Utilities – Administration	Chevrolet – Silverado EV
Light-Duty Pickup	FORD MOTOR CO	F150	2017	2024	Utilities – Administration	Chevrolet – Silverado EV
Light-Duty Pickup	FORD MOTOR CO	F150	2017	2024	Utilities – Administration	Chevrolet – Silverado EV
Light-Duty Pickup	FORD MOTOR CO	F150	2017	2024	Environmental-Operations	Chevrolet – Silverado EV
Light-Duty Pickup	FORD MOTOR CO	F150	2017	2024	Environmental-Stormwater Mgmt	Chevrolet – Silverado EV
Light-Duty Pickup	FORD MOTOR CO	F150	2018	2024	Utilities-Water Reclamation	Chevrolet – Silverado EV
Light-Duty Pickup	FORD MOTOR CO	F150	2018	2024	Eng Construction Inspection Div	Chevrolet – Silverado EV

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Vehicle Type	Make	Model	Year	Retirement Year	Base Site Name	Replacement Make/Model
Light-Duty Pickup	FORD MOTOR CO	F150	2018	2024	Eng Construction Inspection Div	Chevrolet – Silverado EV
Light-Duty Pickup	FORD MOTOR CO	F150	2018	2024	Eng Construction Inspection Div	Chevrolet – Silverado EV
Light-Duty Pickup	FORD MOTOR CO	F150	2018	2024	Eng Construction Inspection Div	Chevrolet – Silverado EV
Light-Duty Pickup	FORD MOTOR CO	F150	2018	2024	Eng Construction Inspection Div	Chevrolet – Silverado EV
Light-Duty Pickup	FORD MOTOR CO	F150	2018	2024	Eng Construction Inspection Div	Chevrolet – Silverado EV
Light-Duty Pickup	FORD MOTOR CO	F150	2018	2024	Facilities – Maintenance Adm	Chevrolet – Silverado EV
Light-Duty Pickup	FORD MOTOR CO	F150	2018	2024	Utilities – Administration	Chevrolet – Silverado EV
Light-Duty Pickup	FORD MOTOR CO	F150	2019	2030	Facilities – Maintenance Adm	Chevrolet – Silverado EV
Light-Duty Pickup	FORD MOTOR CO	F150	2019	2030	Facilities – Maintenance Adm	Chevrolet – Silverado EV
Light-Duty Pickup	FORD MOTOR CO	F150	2019	2027	Parks, Park Ops, Z4, Rockburn Park	Chevrolet – Silverado EV
Light-Duty Pickup	FORD MOTOR CO	F150	2019	2027	Parks, Park Ops, Z1, Cedar Lane Park	Chevrolet – Silverado EV
Light-Duty Pickup	FORD MOTOR CO	F150	2019	2030	Eng Construction Inspection Div	Chevrolet – Silverado EV
Light-Duty Pickup	FORD MOTOR CO	F150	2019	2030	Eng Construction Inspection Div	Chevrolet – Silverado EV
Light-Duty Pickup	FORD MOTOR CO	F150	2020	2030	Eng Construction Inspection Div	Chevrolet – Silverado EV
Light-Duty Pickup	FORD MOTOR CO	F150	2020	2030	Eng Construction Inspection Div	Chevrolet – Silverado EV
Light-Duty Pickup	FORD MOTOR CO	F150	2020	2030	Eng Construction Inspection Div	Chevrolet – Silverado EV
Light-Duty Pickup	FORD MOTOR CO	F150	2020	2030	Eng Construction Inspection Div	Chevrolet – Silverado EV
Light-Duty Pickup	FORD MOTOR CO	F150 CREW CAB	2020	2030	Eng Construction Inspection Div	Chevrolet – Silverado EV
Light-Duty Pickup	FORD MOTOR CO	F150 CREW CAB	2020	2030	Eng Construction Inspection Div	Chevrolet – Silverado EV
Light-Duty Pickup	FORD MOTOR CO	F150 CREW CAB	2020	2030	Eng Construction Inspection Div	Chevrolet – Silverado EV

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Vehicle Type	Make	Model	Year	Retirement Year	Base Site Name	Replacement Make/Model
Light-Duty Pickup	FORD MOTOR CO	F150 CREW CAB	2020	2030	Eng Construction Inspection Div	Chevrolet – Silverado EV
Light-Duty Pickup	FORD MOTOR CO	F150 CREW CAB	2020	2030	Public Works-Director's Office	Chevrolet – Silverado EV
Light-Duty Pickup	FORD MOTOR CO	F150	2020	2029	Facilities - Maintenance Adm	Chevrolet – Silverado EV
Light-Duty Pickup	FORD MOTOR CO	f150	2016	2030	Fire & Rescue-Logistics	Chevrolet – Silverado EV
Light-Duty Pickup	FORD MOTOR CO	F150	2016	2030	Fire & Rescue-Logistics	Chevrolet – Silverado EV
Light-Duty Pickup	DODGE	1500 ST 4X4 DS6L41	2016	2030	Fire & Rescue-Logistics	Chevrolet – Silverado EV
Light-Duty Pickup	DODGE	1500 ST 4X4 DS6L41	2016	2030	Fire & Rescue-Logistics	Chevrolet – Silverado EV
Light-Duty Pickup	DODGE	RAM 1500	2016	2030	Fire & Rescue-Logistics	Chevrolet – Silverado EV
Light-Duty Pickup	DODGE	RAM 1500	2016	2030	Fire & Rescue-Logistics	Chevrolet – Silverado EV
Light-Duty Pickup	CHEVROLET	SILVERADO 1500	2011	2024	Sheriff-Admin	Chevrolet – Silverado EV
Light-Duty Pickup	DODGE	1500 RAM PICKUP	2014	2024	Police-Management Svc Bureau	Chevrolet – Silverado EV
Light-Duty Pickup	DODGE	1500	2014	2024	Police-Management Svc Bureau	Chevrolet – Silverado EV
Light-Duty Pickup	FORD MOTOR CO	F150 XLT	2014	2024	Police-Management Svc Bureau	Chevrolet – Silverado EV
Light-Duty Pickup	FORD MOTOR CO	F150 SUPERCAB	2015	2024	Police-Management Svc Bureau	Chevrolet – Silverado EV
Light-Duty Pickup	FORD MOTOR CO	F150	2016	2024	Police-Management Svc Bureau	Chevrolet – Silverado EV
Light-Duty Pickup	FORD MOTOR CO	F150	2016	2024	Police-Management Svc Bureau	Chevrolet – Silverado EV
Light-Duty Pickup	DODGE	1500 RAM PICKUP	2017	2024	Police-Management Svc Bureau	Chevrolet – Silverado EV
Light-Duty Pickup	FORD MOTOR CO	F150	2017	2024	Police-Management Svc Bureau	Chevrolet – Silverado EV
Light-Duty Pickup	FORD MOTOR CO	F150	2017	2024	Police-Management Svc Bureau	Chevrolet – Silverado EV
Light-Duty Pickup	FORD MOTOR CO	F150	2018	2024	Police-Management Svc Bureau	Chevrolet – Silverado EV
Light-Duty Pickup	FORD MOTOR CO	F150	2018	2024	Police-Management Svc Bureau	Chevrolet – Silverado EV
Light-Duty Pickup	CHEVROLET	SILVERADO 1500 CREW	2017	2024	Police-Management Svc Bureau	Chevrolet – Silverado EV

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Vehicle Type	Make	Model	Year	Retirement Year	Base Site Name	Replacement Make/Model
Light-Duty Pickup	DODGE	1500 RAM PICKUP	2018	2024	Police-Management Svc Bureau	Chevrolet – Silverado EV
Light-Duty Pickup	FORD MOTOR CO	F150 SUPERCAB	2015	2024	Fire & Rescue-Logistics	Chevrolet – Silverado EV
Light-Duty Pickup	CHEVROLET	SILVERADO 1500	2009	2024	Fire & Rescue-Logistics	Chevrolet – Silverado EV
Light-Duty Pickup	FORD MOTOR CO	F150	2013	2024	Fire & Rescue-Logistics	Chevrolet – Silverado EV
Light-Duty Pickup	FORD MOTOR CO	F150	2014	2024	Fire & Rescue-Logistics	Chevrolet – Silverado EV
Light-Duty Pickup	CHEVROLET	SILVERADO	2019	2024	Fire & Rescue-Logistics	Chevrolet – Silverado EV
Light-Duty Pickup	FORD MOTOR CO	F150 SUPERCAB	2018	2024	Fire & Rescue-Logistics	Chevrolet – Silverado EV
Light-Duty Pickup	DODGE	RAM 2500	2011	2024	Environmental-Operations	Chevrolet – Silverado EV
Light-Duty Pickup	DODGE	RAM 2500 ST	2011	2024	Parks, Park Ops, HLMD, HQ	Chevrolet – Silverado EV
Light-Duty Pickup	DODGE	RAM 2500	2011	2024	Sports/Adventure, Outdoor Programs	Chevrolet – Silverado EV
Light-Duty Pickup	DODGE	RAM 2500	2011	2024	Parks, Park Ops, HLMD, HQ	Chevrolet – Silverado EV
Light-Duty Pickup	DODGE	RAM 2500 ST	2013	2024	Office of Corrections-Adm	Chevrolet – Silverado EV
Light-Duty Pickup	FORD MOTOR CO	F250 SUPER DUTY	2012	2024	Office of Central Services Adm	Chevrolet – Silverado EV
Light-Duty Pickup	CHEVROLET	SILVERADO 2500HD	2013	2024	Utilities – Administration	Chevrolet – Silverado EV
Light-Duty Pickup	CHEVROLET	SILVERADO 2500HD	2013	2024	Utilities-Water Reclamation	Chevrolet – Silverado EV
Light-Duty Pickup	DODGE	2500	2013	2024	Highways-Maintenance-Central-Dayton	Chevrolet – Silverado EV
Light-Duty Pickup	CHEVROLET	SILVERADO 2500HD	2013	2024	Utilities-Water Reclamation	Chevrolet – Silverado EV
Light-Duty Pickup	CHEVROLET	SILVERADO 2500HD	2013	2024	Utilities-Water Reclamation	Chevrolet – Silverado EV
Light-Duty Pickup	CHEVROLET	SILVERADO 2500HD	2013	2024	Utilities-Water Reclamation	Chevrolet – Silverado EV
Light-Duty Pickup	CHEVROLET	SILVERADO 2500HD	2013	2024	Tech/Comm – Radio Maint	Chevrolet – Silverado EV
Light-Duty Pickup	CHEVROLET	2500HD	2013	2024	Engineering-Survey Division	Chevrolet – Silverado EV
Light-Duty Pickup	CHEVROLET	2500HD	2014	2024	Police-Management Svc Bureau	Chevrolet – Silverado EV
Light-Duty Pickup	CHEVROLET	SILVERADO 2500HD	2014	2024	Highways-Maintenance-East-Mayfield	Chevrolet – Silverado EV
Light-Duty Pickup	CHEVROLET	SILVERADO 2500HD	2014	2024	Highways-Maintenance-Central-Dayton	Chevrolet – Silverado EV
Light-Duty Pickup	CHEVROLET	2500HD	2014	2024	Eng Construction Inspection Div	Chevrolet – Silverado EV

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Vehicle Type	Make	Model	Year	Retirement Year	Base Site Name	Replacement Make/Model
Light-Duty Pickup	CHEVROLET	2500	2015	2024	Highways-Maintenance-West-Cooksville	Chevrolet - Silverado EV
Light-Duty Pickup	CHEVROLET	SILVERADO 2500HD	2015	2024	Utilities - Administration	Chevrolet - Silverado EV
Light-Duty Pickup	CHEVROLET	SILVERADO 2500HD	2015	2024	Office of Central Services Adm	Chevrolet - Silverado EV
Light-Duty Pickup	FORD MOTOR CO	F250	2015	2024	Utilities - Administration	Chevrolet - Silverado EV
Light-Duty Pickup	FORD MOTOR CO	F250	2015	2024	Environmental-Operations	Chevrolet - Silverado EV
Light-Duty Pickup	FORD MOTOR CO	F250	2018	2024	Fire & Rescue-Logistics	Chevrolet - Silverado EV
Light-Duty Pickup	CHEVROLET	SILVERADO 2500	2014	2024	VFD-Ellicott City	Chevrolet - Silverado EV
Light-Duty Pickup	FORD MOTOR CO	F250	2004	2024	Natural Resources, Forestry, HQ	Chevrolet - Silverado EV
Light-Duty Pickup	FORD MOTOR CO	F250	2012	2024	Natural Res, Middle Patuxent Enviro Area	Chevrolet - Silverado EV
Light-Duty Pickup	FORD MOTOR CO	F250 SUPER DUTY	2012	2024	Highways-Maintenance-West-Cooksville	Chevrolet - Silverado EV
Light-Duty Pickup	CHEVROLET	SILVERADO 2500HD	2015	2024	Environmental-Operations	Chevrolet - Silverado EV
Light-Duty Pickup	CHEVROLET	SILVERADO 2500	2015	2024	Cap. Projects Bureau, Construction, HQ	Chevrolet - Silverado EV
Light-Duty Pickup	FORD MOTOR CO	F250	2015	2025	Utilities - Administration	Chevrolet - Silverado EV
Light-Duty Pickup	FORD MOTOR CO	F250	2015	2025	Utilities-Water Reclamation	Chevrolet - Silverado EV
Light-Duty Pickup	FORD MOTOR CO	F250	2016	2025	Utilities-Water Reclamation	Chevrolet - Silverado EV
Light-Duty Pickup	FORD MOTOR CO	F250	2016	2025	Utilities-Water Reclamation	Chevrolet - Silverado EV
Light-Duty Pickup	FORD MOTOR CO	F250	2016	2025	Highways-Maintenance-Central-Dayton	Chevrolet - Silverado EV
Light-Duty Pickup	FORD MOTOR CO	F250	2016	2025	Utilities-Water Reclamation	Chevrolet - Silverado EV
Light-Duty Pickup	FORD MOTOR CO	F250	2016	2025	Utilities - Administration	Chevrolet - Silverado EV
Light-Duty Pickup	FORD MOTOR CO	F250	2016	2025	Utilities - Administration	Chevrolet - Silverado EV
Light-Duty Pickup	FORD MOTOR CO	F250	2016	2025	Utilities - Administration	Chevrolet - Silverado EV
Light-Duty Pickup	FORD MOTOR CO	F250	2016	2025	Utilities - Administration	Chevrolet - Silverado EV
Light-Duty Pickup	FORD MOTOR CO	F250	2018	2029	Utilities - Administration	Chevrolet - Silverado EV
Light-Duty Pickup	FORD MOTOR CO	F250	2018	2029	Utilities - Administration	Chevrolet - Silverado EV
Light-Duty Pickup	FORD MOTOR CO	F250	2019	2029	Utilities - Administration	Chevrolet - Silverado EV
Light-Duty Pickup	FORD MOTOR CO	F250	2019	2029	Utilities-Water Reclamation	Chevrolet - Silverado EV

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Vehicle Type	Make	Model	Year	Retirement Year	Base Site Name	Replacement Make/Model
Light-Duty Pickup	FORD MOTOR CO	F250 XL UTILITY	2018	2029	Facilities – Maintenance Adm	Chevrolet – Silverado EV
Light-Duty Pickup	FORD MOTOR CO	F250	2019	2030	Utilities–Water Reclamation	Chevrolet – Silverado EV
Light-Duty Pickup	FORD MOTOR CO	F250 XL 8' UTIL BDY	2021	2031	Environmental-Operations	Chevrolet – Silverado EV
Light-Duty Pickup	FORD MOTOR CO	F250	2021	2031	Environmental-Operations	Chevrolet – Silverado EV
Light-Duty Pickup	FORD MOTOR CO	F250	2021	2031	Environmental-Operations	Chevrolet – Silverado EV
Light-Duty Pickup	FORD MOTOR CO	F250	2005	2024	Fire & Rescue-Logistics	Chevrolet – Silverado EV
Light-Duty Pickup	FORD MOTOR CO	F250	2006	2024	VFD–Savage	Chevrolet – Silverado EV
Light-Duty Pickup	CHEVROLET	2500	2015	2025	Fire & Rescue-Logistics	Chevrolet – Silverado EV
Light-Duty Pickup	FORD MOTOR CO	F250	2019	2024	Police–Management Svc Bureau	Chevrolet – Silverado EV
Light-Duty Pickup	DODGE	1500	2014	2024	Facilities – Maintenance Adm	Chevrolet – Silverado EV
Light-Duty Pickup	DODGE	RAM	2014	2024	Facilities – Maintenance Adm	Chevrolet – Silverado EV
Van	DODGE	RAM PROMASTER 1500	2014	2024	Police–Management Svc Bureau	Ford – E–Transit Cargo Van
Van	DODGE	PROMASTER 1500	2015	2024	Facilities – Maintenance Adm	Ford – E–Transit Cargo Van
Van	DODGE	Promaster 1500	2015	2024	Facilities – Maintenance Adm	Ford – E–Transit Cargo Van
Van	DODGE	Ram Cargo	2015	2024	Utilities – Administration	Ford – E–Transit Cargo Van
Van	FORD MOTOR CO	TRANSIT 150	2018	2024	Utilities – Administration	Ford – E–Transit Cargo Van
Van	FORD MOTOR CO	TRANSIT 150 MID ROOF	2019	2026	Fire & Rescue–Logistics	Ford – E–Transit Cargo Van
Van	GMC – GENERAL MOTORS CO	SAVANA	2009	2024	Home & Comm Based Srvcs	Ford – E–Transit Cargo Van
Van	FORD MOTOR CO	TRANSIT CONNECT	2010	2024	Police–Management Svc Bureau	Ford – E–Transit Cargo Van
Van	FORD MOTOR CO	TRANSIT CONNECT XL	2016	2024	Police–Management Svc Bureau	Ford – E–Transit Cargo Van
Van	FORD MOTOR CO	TRANSIT CONNECT XL	2020	2024	Police–Management Svc Bureau	Ford – E–Transit Cargo Van
Van	FORD MOTOR CO	TRANSIT CONNECT XL	2020	2024	Fire & Rescue–Logistics	Ford – E–Transit Cargo Van
Van	CHEVROLET	EXPRESS 3500	2006	2026	Rec, Registration, Vans	Ford – E–Transit Cargo Van

Vehicle Type	Make	Model	Year	Retirement Year	Base Site Name	Replacement Make/Model
Medium-Duty Vocational Truck	INTERNATIONAL	4700 T444E	2001	2024	Highways-Maintenance-East-Mayfield	Ford - E-Transit Chassis Cab

**Note: These are vehicles used for comparison purposes, not an endorsement of any individual EV manufacturer or model. See DOE's [fueleconomy.gov](https://www.fueleconomy.gov) website for all vehicle models available.*

Scenario Two

Vehicle Type	Make	Model	Year	Retirement Year	Base Site Name	Replacement Make/Model
SUV	CHEVROLET	TRAILBLAZER	2007	2024	Utilities-Water Reclamation	Chevrolet - Equinox EV 1LT
SUV	CHEVROLET	TRAILBLAZER	2007	2024	Office of Central Services Adm	Chevrolet - Equinox EV 1LT
SUV	FORD MOTOR CO	ESCAPE	2013	2024	Utilities - Administration	Kia - Niro Plug-in Hybrid SUV
SUV	FORD MOTOR CO	ESCAPE	2014	2024	Facilities - Maintenance Adm	Chevrolet - Equinox EV 1LT
SUV	FORD MOTOR CO	ESCAPE	2014	2024	Environmental-Stormwater Mgmt	Kia - Niro Plug-in Hybrid SUV
SUV	FORD MOTOR CO	ESCAPE	2014	2024	Utilities-Water Reclamation	Chevrolet - Equinox EV 1LT
SUV	FORD MOTOR CO	ESCAPE	2015	2024	Cap. Projects Bureau, Construction, HQ	Chevrolet - Equinox EV 1LT
SUV	FORD MOTOR CO	ESCAPE SE	2015	2024	Public Works-Director's Office	Chevrolet - Equinox EV 1LT
SUV	FORD MOTOR CO	ESCAPE	2015	2024	Facilities - Maintenance Adm	Chevrolet - Equinox EV 1LT
SUV	FORD MOTOR CO	ESCAPE	2015	2024	Facilities - Maintenance Adm	Chevrolet - Equinox EV 1LT
SUV	FORD MOTOR CO	ESCAPE	2015	2024	Facilities - Maintenance Adm	Chevrolet - Equinox EV 1LT
SUV	FORD MOTOR CO	ESCAPE	2015	2024	Fire & Rescue-Logistics	Chevrolet - Equinox EV 1LT
SUV	FORD MOTOR CO	ESCAPE SE	2016	2024	Utilities-Water Reclamation	Kia - Niro Plug-in Hybrid SUV
SUV	FORD MOTOR CO	ESCAPE SE	2016	2024	Facilities - Maintenance Adm	Chevrolet - Equinox EV 1LT
SUV	FORD MOTOR CO	ESCAPE	2017	2024	Housing and Community Develop	Kia - Niro Plug-in Hybrid SUV
SUV	FORD MOTOR CO	ESCAPE	2016	2024	Eng Construction Inspection Div	Kia - Niro Plug-in Hybrid SUV
SUV	FORD MOTOR CO	ESCAPE SE	2017	2024	Rec and Parks Directors Office	Chevrolet - Equinox EV 1LT
SUV	FORD MOTOR CO	ESCAPE TITANIUM	2016	2024	Citizens Svcs-Administration	Chevrolet - Equinox EV 1LT
SUV	FORD MOTOR CO	ESCAPE SE	2017	2024	Inspect-Lic-Permits-Adm	Kia - Niro Plug-in Hybrid SUV
SUV	FORD MOTOR CO	ESCAPE SE	2017	2024	Inspect-Lic-Permits-Adm	Chevrolet - Equinox EV 1LT
SUV	FORD MOTOR CO	ESCAPE SE	2017	2027	Inspect-Lic-Permits-Adm	Kia - Niro Plug-in Hybrid SUV
SUV	FORD MOTOR CO	ESCAPE SE	2017	2027	Inspect-Lic-Permits-Adm	Kia - Niro Plug-in Hybrid SUV
SUV	FORD MOTOR CO	ESCAPE SE	2017	2025	Facilities - Maintenance Adm	Chevrolet - Equinox EV 1LT
SUV	FORD MOTOR CO	ESCAPE	2017	2025	Highways - Administration	Kia - Niro Plug-in Hybrid SUV
SUV	FORD MOTOR CO	ESCAPE	2017	2025	Highways - Administration	Chevrolet - Equinox EV 1LT

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Vehicle Type	Make	Model	Year	Retirement Year	Base Site Name	Replacement Make/Model
SUV	FORD MOTOR CO	ESCAPE	2017	2025	Office of Risk Management Adm	Chevrolet - Equinox EV 1LT
SUV	FORD MOTOR CO	ESCAPE	2017	2025	Planning & Zoning-Directors	Kia - Niro Plug-in Hybrid SUV
SUV	FORD MOTOR CO	ESCAPE	2017	2026	Highways - Administration	Chevrolet - Equinox EV 1LT
SUV	FORD MOTOR CO	ESCAPE	2018	2026	Tech/Comm - WAN	Kia - Niro Plug-in Hybrid SUV
SUV	FORD MOTOR CO	ESCAPE SE	2017	2027	Rec and Parks Directors Office	Chevrolet - Equinox EV 1LT
SUV	FORD MOTOR CO	ESCAPE	2017	2026	Utilities - Administration	Kia - Niro Plug-in Hybrid SUV
SUV	FORD MOTOR CO	ESCAPE SE	2018	2028	DPW - Traffic Engineering Div	Chevrolet - Equinox EV 1LT
SUV	FORD MOTOR CO	ESCAPE SE	2018	2028	DPW - Traffic Engineering Div	Chevrolet - Equinox EV 1LT
SUV	FORD MOTOR CO	ESCAPE SE	2018	2029	Inspect-Lic-Permits-Adm	Chevrolet - Equinox EV 1LT
SUV	FORD MOTOR CO	ESCAPE SE	2018	2032	Inspect-Lic-Permits-Adm	Chevrolet - Equinox EV 1LT
SUV	FORD MOTOR CO	ESCAPE SE	2018	2032	Inspect-Lic-Permits-Adm	Chevrolet - Equinox EV 1LT
SUV	FORD MOTOR CO	ESCAPE SE	2018	2029	Inspect-Lic-Permits-Adm	Chevrolet - Equinox EV 1LT
SUV	FORD MOTOR CO	ESCAPE SE	2018	2028	Facilities - Maintenance Adm	Chevrolet - Equinox EV 1LT
SUV	FORD MOTOR CO	ESCAPE SE	2018	2028	Office of Corrections-Adm	Chevrolet - Equinox EV 1LT
SUV	FORD MOTOR CO	ESCAPE SE	2018	2028	Office of Corrections-Adm	Chevrolet - Equinox EV 1LT
SUV	FORD MOTOR CO	ESCAPE SE	2018	2028	Office of Corrections-Adm	Kia - Niro Plug-in Hybrid SUV
SUV	FORD MOTOR CO	ESCAPE SE	2018	2029	Natural Resources, Forestry, HQ	Chevrolet - Equinox EV 1LT
SUV	FORD MOTOR CO	ESCAPE SE	2018	2029	Natural Resources, Forestry, HQ	Kia - Niro Plug-in Hybrid SUV
SUV	FORD MOTOR CO	ESCAPE SE	2019	2029	Natural Resources, Forestry, HQ	Chevrolet - Equinox EV 1LT
SUV	FORD MOTOR CO	ESCAPE SE	2019	2029	Utilities - Administration	Kia - Niro Plug-in Hybrid SUV
SUV	FORD MOTOR CO	ESCAPE SE	2019	2029	Utilities - Administration	Kia - Niro Plug-in Hybrid SUV
SUV	FORD MOTOR CO	ESCAPE SE	2019	2030	Rec and Parks Directors Office	Kia - Niro Plug-in Hybrid SUV
SUV	FORD MOTOR CO	ESCAPE SE	2019	2028	Office of Central Services Adm	Chevrolet - Equinox EV 1LT
SUV	FORD MOTOR CO	ESCAPE SE HYBRID	2020	2031	Rec and Parks Directors Office	Kia - Niro Plug-in Hybrid SUV
SUV	FORD MOTOR CO	ESCAPE	2021	2029	Eng Construction Inspection Div	Kia - Niro Plug-in Hybrid SUV

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SUV	FORD MOTOR CO	ESCAPE SE HYBRID	2021	2030	Dept. Technology/Comm Svcs Adm	Kia - Niro Plug-in Hybrid SUV
SUV	FORD MOTOR CO	ESCAPE	2015	2024	Fire & Rescue-Logistics	Chevrolet - Equinox EV 1LT
SUV	FORD MOTOR CO	ESCAPE	2015	2024	Fire & Rescue-Logistics	Chevrolet - Equinox EV 1LT
SUV	CHEVROLET	1AT46 HHR	2011	2024	Fire & Rescue-Logistics	Kia - Niro Plug-in Hybrid SUV
SUV	FORD MOTOR CO	ESCAPE	2013	2024	Fire & Rescue-Logistics	Kia - Niro Plug-in Hybrid SUV
SUV	FORD MOTOR CO	ESCAPE SE	2013	2024	Fire & Rescue-Logistics	Kia - Niro Plug-in Hybrid SUV
SUV	FORD MOTOR CO	ESCAPE SE U9G7	2017	2024	Fire & Rescue-Logistics	Kia - Niro Plug-in Hybrid SUV
Sedan	CHEVROLET	IMPALA	2006	2024	Office of Purchasing - Admin.	Nissan - Leaf S
Sedan	CHEVROLET	IMPALA	2009	2024	State's Attorney-Admin	Nissan - Leaf S
Sedan	FORD MOTOR CO	FOCUS	2012	2024	Health Dept County Funding Adm	Nissan - Leaf S
Sedan	CHEVROLET	MALIBU	2014	2024	Utilities - Administration	Nissan - Leaf S
Sedan	FORD MOTOR CO	FUSION	2014	2024	Utilities - Administration	Nissan - Leaf S
Sedan	CHEVROLET	MALIBU	2015	2024	Inspect-Lic-Permits-Adm	Nissan - Leaf S
SUV	SUBARU	XV CROSSTREK HYBRID	2015	2024	Utilities-Water Reclamation	Kia - Niro Plug-in Hybrid SUV
SUV	SUBARU	XV CROSSTREK HYBRID	2016	2024	Environmental-Operations	Chevrolet - Equinox EV 1LT
SUV	SUBARU	CROSSTREK HYBRID	2016	2024	Facilities - Maintenance Adm	Kia - Niro Plug-in Hybrid SUV
SUV	SUBARU	CROSSTREK HYBRID	2016	2024	Highways - Administration	Chevrolet - Equinox EV 1LT
SUV	SUBARU	CROSSTREK HYBRID	2016	2024	Facilities - Maintenance Adm	Chevrolet - Equinox EV 1LT
Sedan	HONDA	ACCORD	2014	2024	Fire & Rescue-Logistics	Nissan - Leaf S
SUV	CHEVROLET	TAHOE	2019	2024	Police-Management Svc Bureau	Ford - Mustang Mach-E Premium RWD Extended Range (Police)
Sedan	FORD MOTOR CO	FOCUS	2011	2024	Health Dept County Funding Adm	Nissan - Leaf S
Sedan	FORD MOTOR CO	FOCUS	2011	2024	Health Dept County Funding Adm	Nissan - Leaf S
Sedan	FORD MOTOR CO	FOCUS	2011	2024	Health Dept County Funding Adm	Nissan - Leaf S
Sedan	FORD MOTOR CO	FOCUS	2011	2024	Health Dept County Funding Adm	Nissan - Leaf S

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Vehicle Type	Make	Model	Year	Retirement Year	Base Site Name	Replacement Make/Model
Sedan	FORD MOTOR CO	FOCUS	2014	2024	Health Dept County Funding Adm	Nissan - Leaf S
Sedan	FORD MOTOR CO	FOCUS	2014	2024	Health Dept County Funding Adm	Nissan - Leaf S
Sedan	FORD MOTOR CO	FOCUS	2014	2024	Health Dept County Funding Adm	Nissan - Leaf S
Sedan	FORD MOTOR CO	FOCUS	2015	2024	Health Dept County Funding Adm	Nissan - Leaf S
Sedan	FORD MOTOR CO	FOCUS	2016	2024	Health Dept County Funding Adm	Nissan - Leaf S
Sedan	FORD MOTOR CO	FOCUS	2016	2024	Health Dept County Funding Adm	Nissan - Leaf S
Sedan	FORD MOTOR CO	FOCUS	2016	2024	Health Dept County Funding Adm	Nissan - Leaf S
Sedan	FORD MOTOR CO	FOCUS	2017	2025	Health Dept County Funding Adm	Nissan - Leaf S
Sedan	FORD MOTOR CO	FOCUS	2017	2026	Health Dept County Funding Adm	Nissan - Leaf S
Sedan	FORD MOTOR CO	FOCUS	2017	2026	Health Dept County Funding Adm	Nissan - Leaf S
SUV	FORD MOTOR CO	INTERCEPTOR UTILITY	2018	2024	Police-Management Svc Bureau	Ford - Mustang Mach-E Premium RWD Extended Range (Police)
SUV	FORD MOTOR CO	UTILITY INTERCEPTOR	2014	2024	Police-Management Svc Bureau	Ford - Mustang Mach-E Premium RWD Extended Range (Police)
SUV	FORD MOTOR CO	INTERCEPTOR UTILITY	2016	2024	Police-Management Svc Bureau	Ford - Mustang Mach-E Premium RWD Extended Range (Police)
SUV	FORD MOTOR CO	INTERCEPTOR UTILITY	2017	2024	Police-Management Svc Bureau	Ford - Mustang Mach-E Premium RWD Extended Range (Police)
SUV	FORD MOTOR CO	INTERCEPTOR UTILITY	2017	2024	Police-Management Svc Bureau	Ford - Mustang Mach-E Premium RWD Extended Range (Police)
SUV	FORD MOTOR CO	INTERCEPTOR UTILITY	2017	2024	Police-Management Svc Bureau	Ford - Mustang Mach-E Premium RWD Extended Range (Police)
SUV	FORD MOTOR CO	INTERCEPTOR UTILITY	2017	2024	Police-Management Svc Bureau	Ford - Mustang Mach-E Premium RWD Extended Range (Police)
SUV	FORD MOTOR CO	INTERCEPTOR UTILITY	2017	2024	Police-Management Svc Bureau	Ford - Mustang Mach-E Premium RWD Extended Range (Police)
SUV	FORD MOTOR CO	INTERCEPTOR UTILITY	2017	2024	Police-Management Svc Bureau	Ford - Mustang Mach-E Premium RWD Extended Range (Police)

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Vehicle Type	Make	Model	Year	Retirement Year	Base Site Name	Replacement Make/Model
SUV	FORD MOTOR CO	INTERCEPTOR UTILITY	2017	2024	Police-Management Svc Bureau	Ford - Mustang Mach-E Premium RWD Extended Range (Police)
SUV	FORD MOTOR CO	EXPLORER POLICE UTL	2018	2024	Police-Management Svc Bureau	Ford - Mustang Mach-E Premium RWD Extended Range (Police)
SUV	FORD MOTOR CO	EXPLORER POLICE UTL	2018	2024	Police-Management Svc Bureau	Ford - Mustang Mach-E Premium RWD Extended Range (Police)
SUV	FORD MOTOR CO	EXPLORER POLICE UTL	2018	2024	Police-Management Svc Bureau	Ford - Mustang Mach-E Premium RWD Extended Range (Police)
SUV	FORD MOTOR CO	EXPLORER POLICE UTL	2018	2024	Police-Management Svc Bureau	Ford - Mustang Mach-E Premium RWD Extended Range (Police)
SUV	FORD MOTOR CO	EXPLORER POLICE UTL	2018	2024	Police-Management Svc Bureau	Ford - Mustang Mach-E Premium RWD Extended Range (Police)
SUV	FORD MOTOR CO	EXPLORER POLICE UTL	2018	2024	Police-Management Svc Bureau	Ford - Mustang Mach-E Premium RWD Extended Range (Police)
SUV	FORD MOTOR CO	EXPLORER POLICE UTL	2018	2024	Police-Management Svc Bureau	Ford - Mustang Mach-E Premium RWD Extended Range (Police)
SUV	FORD MOTOR CO	EXPLORER POLICE UTL	2018	2024	Police-Management Svc Bureau	Ford - Mustang Mach-E Premium RWD Extended Range (Police)
SUV	FORD MOTOR CO	EXPLORER POLICE UTL	2018	2024	Police-Management Svc Bureau	Ford - Mustang Mach-E Premium RWD Extended Range (Police)
SUV	FORD MOTOR CO	EXPLORER POLICE UTL	2019	2025	Police-Management Svc Bureau	Ford - Mustang Mach-E Premium RWD Extended Range (Police)
SUV	FORD MOTOR CO	EXPLORER POLICE UTL	2019	2025	Police-Management Svc Bureau	Ford - Mustang Mach-E Premium RWD Extended Range (Police)
SUV	FORD MOTOR CO	EXPLORER POLICE UTL	2019	2025	Police-Management Svc Bureau	Ford - Mustang Mach-E Premium RWD Extended Range (Police)
SUV	FORD MOTOR CO	EXPLORER POLICE UTL	2019	2025	Police-Management Svc Bureau	Ford - Mustang Mach-E Premium RWD Extended Range (Police)
SUV	FORD MOTOR CO	EXPLORER POLICE UTL	2019	2025	Police-Management Svc Bureau	Ford - Mustang Mach-E Premium RWD Extended Range (Police)

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Vehicle Type	Make	Model	Year	Retirement Year	Base Site Name	Replacement Make/Model
SUV	FORD MOTOR CO	EXPLORER POLICE UTL	2019	2025	Police-Management Svc Bureau	Ford - Mustang Mach-E Premium RWD Extended Range (Police)
SUV	FORD MOTOR CO	EXPLORER POLICE UTL	2019	2025	Police-Management Svc Bureau	Ford - Mustang Mach-E Premium RWD Extended Range (Police)
SUV	FORD MOTOR CO	EXPLORER POLICE UTL	2019	2024	Police-Management Svc Bureau	Ford - Mustang Mach-E Premium RWD Extended Range (Police)
SUV	FORD MOTOR CO	EXPLORER POLICE UTL	2019	2024	Police-Management Svc Bureau	Ford - Mustang Mach-E Premium RWD Extended Range (Police)
Light-Duty Pickup	FORD MOTOR CO	F150	2009	2024	Utilities - Administration	Chevrolet - Silverado EV
Light-Duty Pickup	CHEVROLET	SILVERADO 1500	2010	2024	Utilities-Water Reclamation	Chevrolet - Silverado EV
Light-Duty Pickup	FORD MOTOR CO	F150 XL	2011	2024	Parks, Park Ops, Z3, Schooley Mill Pk.	Chevrolet - Silverado EV
Light-Duty Pickup	FORD MOTOR CO	F150 XL	2011	2024	Natural Res, Robinson Nature Center	Chevrolet - Silverado EV
Light-Duty Pickup	FORD MOTOR CO	F150 XL	2012	2024	Parks, Park Ops, Z4, Rockburn Park	Chevrolet - Silverado EV
Light-Duty Pickup	CHEVROLET	1500	2014	2024	Highways-Maintenance-Central-Dayton	Chevrolet - Silverado EV
Light-Duty Pickup	CHEVROLET	1500	2014	2024	Highways-Maintenance-West-Cooksville	Chevrolet - Silverado EV
Light-Duty Pickup	CHEVROLET	SILVERADO 1500	2014	2024	Highways - Administration	Chevrolet - Silverado EV
Light-Duty Pickup	FORD MOTOR CO	F150 XL	2014	2024	Tech/Comm - Help Desk	Chevrolet - Silverado EV
Light-Duty Pickup	FORD MOTOR CO	F150 XLT	2014	2024	Environmental-Operations	Chevrolet - Silverado EV
Light-Duty Pickup	FORD MOTOR CO	F150	2016	2024	Environmental-Operations	Chevrolet - Silverado EV
Light-Duty Pickup	FORD MOTOR CO	F150	2016	2024	Environmental-Operations	Chevrolet - Silverado EV
Light-Duty Pickup	FORD MOTOR CO	F150	2017	2024	Environmental-Operations	Chevrolet - Silverado EV
Light-Duty Pickup	FORD MOTOR CO	F150	2018	2024	Utilities - Administration	Chevrolet - Silverado EV
Light-Duty Pickup	FORD MOTOR CO	F150	2018	2024	Utilities - Administration	Chevrolet - Silverado EV
Light-Duty Pickup	FORD MOTOR CO	F150	2018	2024	Parks, Park Ops, Z2, Centennial Park	Chevrolet - Silverado EV

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Vehicle Type	Make	Model	Year	Retirement Year	Base Site Name	Replacement Make/Model
Light-Duty Pickup	FORD MOTOR CO	F150	2018	2024	Parks, Park Ops, Z3, Western Regional Pk	Chevrolet - Silverado EV
Light-Duty Pickup	FORD MOTOR CO	F150	2018	2024	Environmental-Operations	Chevrolet - Silverado EV
Light-Duty Pickup	FORD MOTOR CO	F150	2018	2024	Environmental-Operations	Chevrolet - Silverado EV
Light-Duty Pickup	FORD MOTOR CO	F150	2019	2024	Utilities - Administration	Chevrolet - Silverado EV
Light-Duty Pickup	FORD MOTOR CO	F150	2021	2024	Eng Construction Inspection Div	Chevrolet - Silverado EV
Light-Duty Pickup	FORD MOTOR CO	F150	2021	2024	Facilities - Maintenance Adm	Chevrolet - Silverado EV
Light-Duty Pickup	FORD MOTOR CO	F150	2021	2024	Facilities - Maintenance Adm	Chevrolet - Silverado EV
Light-Duty Pickup	FORD MOTOR CO	F150	2021	2024	Environmental-Stormwater Mgmt	Chevrolet - Silverado EV
Light-Duty Pickup	FORD MOTOR CO	F150	2021	2024	Office of Corrections-Adm	Chevrolet - Silverado EV
Light-Duty Pickup	FORD MOTOR CO	F150	2021	2024	Tech/Comm - Help Desk	Chevrolet - Silverado EV
Light-Duty Pickup	FORD MOTOR CO	F150	2021	2029	Environmental-Operations	Chevrolet - Silverado EV
Light-Duty Pickup	FORD MOTOR CO	F150	2021	2029	Parks, Park Ops, Z4, Rockburn Park	Chevrolet - Silverado EV
Light-Duty Pickup	FORD MOTOR CO	F150	2021	2030	Environmental-Operations	Chevrolet - Silverado EV
Light-Duty Pickup	FORD MOTOR CO	F150	2021	2031	Parks, Park Ops, Z2, Centennial Park	Chevrolet - Silverado EV
Light-Duty Pickup	CHEVROLET	SILVERADO	2008	2024	Fire & Rescue-Logistics	Chevrolet - Silverado EV
Light-Duty Pickup	CHEVROLET	SILVERADO	2008	2024	Fire & Rescue-Logistics	Chevrolet - Silverado EV
Light-Duty Pickup	FORD MOTOR CO	F150	2013	2024	Fire & Rescue-Logistics	Chevrolet - Silverado EV
Light-Duty Pickup	CHEVROLET	SILVERADO	2019	2024	Fire & Rescue-Logistics	Chevrolet - Silverado EV
Light-Duty Pickup	CHEVROLET	1500	2014	2024	Natural Resources, Ranger, HQ-Annex	Chevrolet - Silverado EV
Light-Duty Pickup	FORD MOTOR CO	F150	2016	2024	Eng Construction Inspection Div	Chevrolet - Silverado EV
Light-Duty Pickup	FORD MOTOR CO	F150	2016	2024	Eng Construction Inspection Div	Chevrolet - Silverado EV
Light-Duty Pickup	FORD MOTOR CO	F150 XL	2016	2024	Parks, Park Ops, Z3, Schooley Mill Pk.	Chevrolet - Silverado EV
Light-Duty Pickup	FORD MOTOR CO	F150	2017	2024	Highways-Maintenance-East-Mayfield	Chevrolet - Silverado EV
Light-Duty Pickup	FORD MOTOR CO	F150	2017	2024	Eng Construction Inspection Div	Chevrolet - Silverado EV
Light-Duty Pickup	FORD MOTOR CO	F150	2017	2024	Eng Construction Inspection Div	Chevrolet - Silverado EV

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Vehicle Type	Make	Model	Year	Retirement Year	Base Site Name	Replacement Make/Model
Light-Duty Pickup	FORD MOTOR CO	F150	2017	2024	Eng Construction Inspection Div	Chevrolet - Silverado EV
Light-Duty Pickup	FORD MOTOR CO	F150	2017	2024	Eng Construction Inspection Div	Chevrolet - Silverado EV
Light-Duty Pickup	FORD MOTOR CO	F150	2017	2024	Eng Construction Inspection Div	Chevrolet - Silverado EV
Light-Duty Pickup	FORD MOTOR CO	F150	2017	2024	Utilities - Administration	Chevrolet - Silverado EV
Light-Duty Pickup	FORD MOTOR CO	F150	2017	2024	Utilities - Administration	Chevrolet - Silverado EV
Light-Duty Pickup	FORD MOTOR CO	F150	2017	2024	Utilities - Administration	Chevrolet - Silverado EV
Light-Duty Pickup	FORD MOTOR CO	F150	2017	2024	Utilities - Administration	Chevrolet - Silverado EV
Light-Duty Pickup	FORD MOTOR CO	F150	2017	2024	Environmental-Operations	Chevrolet - Silverado EV
Light-Duty Pickup	FORD MOTOR CO	F150	2017	2024	Environmental-Stormwater Mgmt	Chevrolet - Silverado EV
Light-Duty Pickup	FORD MOTOR CO	F150	2018	2024	Utilities-Water Reclamation	Chevrolet - Silverado EV
Light-Duty Pickup	FORD MOTOR CO	F150	2018	2024	Eng Construction Inspection Div	Chevrolet - Silverado EV
Light-Duty Pickup	FORD MOTOR CO	F150	2018	2024	Eng Construction Inspection Div	Chevrolet - Silverado EV
Light-Duty Pickup	FORD MOTOR CO	F150	2018	2024	Eng Construction Inspection Div	Chevrolet - Silverado EV
Light-Duty Pickup	FORD MOTOR CO	F150	2018	2024	Eng Construction Inspection Div	Chevrolet - Silverado EV
Light-Duty Pickup	FORD MOTOR CO	F150	2018	2024	Eng Construction Inspection Div	Chevrolet - Silverado EV
Light-Duty Pickup	FORD MOTOR CO	F150	2018	2024	Eng Construction Inspection Div	Chevrolet - Silverado EV
Light-Duty Pickup	FORD MOTOR CO	F150	2018	2024	Facilities - Maintenance Adm	Chevrolet - Silverado EV
Light-Duty Pickup	FORD MOTOR CO	F150	2018	2024	Utilities - Administration	Chevrolet - Silverado EV
Light-Duty Pickup	FORD MOTOR CO	F150	2019	2030	Facilities - Maintenance Adm	Chevrolet - Silverado EV
Light-Duty Pickup	FORD MOTOR CO	F150	2019	2030	Facilities - Maintenance Adm	Chevrolet - Silverado EV
Light-Duty Pickup	FORD MOTOR CO	F150	2019	2027	Parks, Park Ops, Z4, Rockburn Park	Chevrolet - Silverado EV
Light-Duty Pickup	FORD MOTOR CO	F150	2019	2027	Parks, Park Ops, Z1, Cedar Lane Park	Chevrolet - Silverado EV
Light-Duty Pickup	FORD MOTOR CO	F150	2019	2030	Eng Construction Inspection Div	Chevrolet - Silverado EV
Light-Duty Pickup	FORD MOTOR CO	F150	2019	2030	Eng Construction Inspection Div	Chevrolet - Silverado EV
Light-Duty Pickup	FORD MOTOR CO	F150	2020	2030	Eng Construction Inspection Div	Chevrolet - Silverado EV
Light-Duty Pickup	FORD MOTOR CO	F150	2020	2030	Eng Construction Inspection Div	Chevrolet - Silverado EV

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Vehicle Type	Make	Model	Year	Retirement Year	Base Site Name	Replacement Make/Model
Light-Duty Pickup	FORD MOTOR CO	F150	2020	2030	Eng Construction Inspection Div	Chevrolet - Silverado EV
Light-Duty Pickup	FORD MOTOR CO	F150	2020	2030	Eng Construction Inspection Div	Chevrolet - Silverado EV
Light-Duty Pickup	FORD MOTOR CO	F150 CREW CAB	2020	2030	Eng Construction Inspection Div	Chevrolet - Silverado EV
Light-Duty Pickup	FORD MOTOR CO	F150 CREW CAB	2020	2030	Eng Construction Inspection Div	Chevrolet - Silverado EV
Light-Duty Pickup	FORD MOTOR CO	F150 CREW CAB	2020	2030	Eng Construction Inspection Div	Chevrolet - Silverado EV
Light-Duty Pickup	FORD MOTOR CO	F150 CREW CAB	2020	2030	Eng Construction Inspection Div	Chevrolet - Silverado EV
Light-Duty Pickup	FORD MOTOR CO	F150 CREW CAB	2020	2030	Public Works-Director's Office	Chevrolet - Silverado EV
Light-Duty Pickup	FORD MOTOR CO	F150	2020	2029	Facilities - Maintenance Adm	Chevrolet - Silverado EV
Light-Duty Pickup	FORD MOTOR CO	f150	2016	2030	Fire & Rescue-Logistics	Chevrolet - Silverado EV
Light-Duty Pickup	FORD MOTOR CO	F150	2016	2030	Fire & Rescue-Logistics	Chevrolet - Silverado EV
Light-Duty Pickup	DODGE	1500 ST 4X4 DS6L41	2016	2030	Fire & Rescue-Logistics	Chevrolet - Silverado EV
Light-Duty Pickup	DODGE	1500 ST 4X4 DS6L41	2016	2030	Fire & Rescue-Logistics	Chevrolet - Silverado EV
Light-Duty Pickup	DODGE	RAM 1500	2016	2030	Fire & Rescue-Logistics	Chevrolet - Silverado EV
Light-Duty Pickup	DODGE	RAM 1500	2016	2030	Fire & Rescue-Logistics	Chevrolet - Silverado EV
Light-Duty Pickup	CHEVROLET	SILVERADO 1500	2011	2024	Sheriff-Admin	Chevrolet - Silverado EV
Light-Duty Pickup	DODGE	1500 RAM PICKUP	2014	2024	Police-Management Svc Bureau	Chevrolet - Silverado EV
Light-Duty Pickup	DODGE	1500	2014	2024	Police-Management Svc Bureau	Chevrolet - Silverado EV
Light-Duty Pickup	FORD MOTOR CO	F150 XLT	2014	2024	Police-Management Svc Bureau	Chevrolet - Silverado EV
Light-Duty Pickup	FORD MOTOR CO	F150 SUPERCAB	2015	2024	Police-Management Svc Bureau	Chevrolet - Silverado EV
Light-Duty Pickup	FORD MOTOR CO	F150	2016	2024	Police-Management Svc Bureau	Chevrolet - Silverado EV
Light-Duty Pickup	FORD MOTOR CO	F150	2016	2024	Police-Management Svc Bureau	Chevrolet - Silverado EV
Light-Duty Pickup	DODGE	1500 RAM PICKUP	2017	2024	Police-Management Svc Bureau	Chevrolet - Silverado EV
Light-Duty Pickup	FORD MOTOR CO	F150	2017	2024	Police-Management Svc Bureau	Chevrolet - Silverado EV
Light-Duty Pickup	FORD MOTOR CO	F150	2017	2024	Police-Management Svc Bureau	Chevrolet - Silverado EV
Light-Duty Pickup	FORD MOTOR CO	F150	2018	2024	Police-Management Svc Bureau	Chevrolet - Silverado EV
Light-Duty Pickup	FORD MOTOR CO	F150	2018	2024	Police-Management Svc Bureau	Chevrolet - Silverado EV

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Light-Duty Pickup	CHEVROLET	SILVERADO 1500 CREW	2017	2024	Police-Management Svc Bureau	Chevrolet - Silverado EV
Light-Duty Pickup	DODGE	1500 RAM PICKUP	2018	2024	Police-Management Svc Bureau	Chevrolet - Silverado EV
Light-Duty Pickup	FORD MOTOR CO	F150 SUPERCAB	2015	2024	Fire & Rescue-Logistics	Chevrolet - Silverado EV
Light-Duty Pickup	CHEVROLET	SILVERADO 1500	2009	2024	Fire & Rescue-Logistics	Chevrolet - Silverado EV
Light-Duty Pickup	FORD MOTOR CO	F150	2013	2024	Fire & Rescue-Logistics	Chevrolet - Silverado EV
Light-Duty Pickup	FORD MOTOR CO	F150	2014	2024	Fire & Rescue-Logistics	Chevrolet - Silverado EV
Light-Duty Pickup	CHEVROLET	SILVERADO	2019	2024	Fire & Rescue-Logistics	Chevrolet - Silverado EV
Light-Duty Pickup	FORD MOTOR CO	F150 SUPERCAB	2018	2024	Fire & Rescue-Logistics	Chevrolet - Silverado EV
SUV	CHEVROLET	TAHOE	2019	2024	Police-Management Svc Bureau	Ford - Mustang Mach-E Premium RWD Extended Range (Police)
Light-Duty Pickup	DODGE	RAM 2500	2011	2024	Environmental-Operations	Chevrolet - Silverado EV
Light-Duty Pickup	DODGE	RAM 2500 ST	2011	2024	Parks, Park Ops, HLMD, HQ	Chevrolet - Silverado EV
Light-Duty Pickup	DODGE	RAM 2500	2011	2024	Sports/Adventure, Outdoor Programs	Chevrolet - Silverado EV
Light-Duty Pickup	DODGE	RAM 2500	2011	2024	Parks, Park Ops, HLMD, HQ	Chevrolet - Silverado EV
Light-Duty Pickup	DODGE	RAM 2500 ST	2013	2024	Office of Corrections-Adm	Chevrolet - Silverado EV
Light-Duty Pickup	FORD MOTOR CO	F250 SUPER DUTY	2012	2024	Office of Central Services Adm	Chevrolet - Silverado EV
Light-Duty Pickup	CHEVROLET	SILVERADO 2500HD	2013	2024	Utilities - Administration	Chevrolet - Silverado EV
Light-Duty Pickup	CHEVROLET	SILVERADO 2500HD	2013	2024	Utilities-Water Reclamation	Chevrolet - Silverado EV
Light-Duty Pickup	DODGE	2500	2013	2024	Highways-Maintenance-Central-Dayton	Chevrolet - Silverado EV
Light-Duty Pickup	CHEVROLET	SILVERADO 2500HD	2013	2024	Utilities-Water Reclamation	Chevrolet - Silverado EV
Light-Duty Pickup	CHEVROLET	SILVERADO 2500HD	2013	2024	Utilities-Water Reclamation	Chevrolet - Silverado EV
Light-Duty Pickup	CHEVROLET	SILVERADO 2500HD	2013	2024	Utilities-Water Reclamation	Chevrolet - Silverado EV
Light-Duty Pickup	CHEVROLET	SILVERADO 2500HD	2013	2024	Tech/Comm - Radio Maint	Chevrolet - Silverado EV
Light-Duty Pickup	CHEVROLET	2500HD	2013	2024	Engineering-Survey Division	Chevrolet - Silverado EV
Light-Duty Pickup	CHEVROLET	2500HD	2014	2024	Police-Management Svc Bureau	Chevrolet - Silverado EV

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Light-Duty Pickup	CHEVROLET	SILVERADO 2500HD	2014	2024	Highways-Maintenance-East-Mayfield	Chevrolet - Silverado EV
Light-Duty Pickup	CHEVROLET	SILVERADO 2500HD	2014	2024	Highways-Maintenance-Central-Dayton	Chevrolet - Silverado EV
Light-Duty Pickup	CHEVROLET	2500HD	2014	2024	Eng Construction Inspection Div	Chevrolet - Silverado EV
Light-Duty Pickup	CHEVROLET	2500	2015	2024	Highways-Maintenance-West-Cooksville	Chevrolet - Silverado EV
Light-Duty Pickup	CHEVROLET	SILVERADO 2500HD	2015	2024	Utilities - Administration	Chevrolet - Silverado EV
Light-Duty Pickup	CHEVROLET	SILVERADO 2500HD	2015	2024	Office of Central Services Adm	Chevrolet - Silverado EV
Light-Duty Pickup	FORD MOTOR CO	F250	2015	2024	Utilities - Administration	Chevrolet - Silverado EV
Light-Duty Pickup	FORD MOTOR CO	F250	2015	2024	Environmental-Operations	Chevrolet - Silverado EV
Light-Duty Pickup	FORD MOTOR CO	F250	2018	2024	Fire & Rescue-Logistics	Chevrolet - Silverado EV
Light-Duty Pickup	CHEVROLET	SILVERADO 2500	2014	2024	VFD-Ellicott City	Chevrolet - Silverado EV
Light-Duty Pickup	FORD MOTOR CO	F250	2004	2024	Natural Resources, Forestry, HQ	Chevrolet - Silverado EV
Light-Duty Pickup	FORD MOTOR CO	F250	2012	2024	Natural Res, Middle Patuxent Enviro Area	Chevrolet - Silverado EV
Light-Duty Pickup	FORD MOTOR CO	F250 SUPER DUTY	2012	2024	Highways-Maintenance-West-Cooksville	Chevrolet - Silverado EV
Light-Duty Pickup	CHEVROLET	SILVERADO 2500HD	2015	2024	Environmental-Operations	Chevrolet - Silverado EV
Light-Duty Pickup	CHEVROLET	SILVERADO 2500	2015	2024	Cap. Projects Bureau, Construction, HQ	Chevrolet - Silverado EV
Light-Duty Pickup	FORD MOTOR CO	F250	2015	2025	Utilities - Administration	Chevrolet - Silverado EV
Light-Duty Pickup	FORD MOTOR CO	F250	2015	2025	Utilities-Water Reclamation	Chevrolet - Silverado EV
Light-Duty Pickup	FORD MOTOR CO	F250	2016	2025	Utilities-Water Reclamation	Chevrolet - Silverado EV
Light-Duty Pickup	FORD MOTOR CO	F250	2016	2025	Utilities-Water Reclamation	Chevrolet - Silverado EV
Light-Duty Pickup	FORD MOTOR CO	F250	2016	2025	Highways-Maintenance-Central-Dayton	Chevrolet - Silverado EV
Light-Duty Pickup	FORD MOTOR CO	F250	2016	2025	Utilities-Water Reclamation	Chevrolet - Silverado EV
Light-Duty Pickup	FORD MOTOR CO	F250	2016	2025	Utilities - Administration	Chevrolet - Silverado EV
Light-Duty Pickup	FORD MOTOR CO	F250	2016	2025	Utilities - Administration	Chevrolet - Silverado EV

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Vehicle Type	Make	Model	Year	Retirement Year	Base Site Name	Replacement Make/Model
Light-Duty Pickup	FORD MOTOR CO	F250	2016	2025	Utilities - Administration	Chevrolet - Silverado EV
Light-Duty Pickup	FORD MOTOR CO	F250	2018	2029	Utilities - Administration	Chevrolet - Silverado EV
Light-Duty Pickup	FORD MOTOR CO	F250	2018	2029	Utilities - Administration	Chevrolet - Silverado EV
Light-Duty Pickup	FORD MOTOR CO	F250	2019	2029	Utilities - Administration	Chevrolet - Silverado EV
Light-Duty Pickup	FORD MOTOR CO	F250	2019	2029	Utilities-Water Reclamation	Chevrolet - Silverado EV
Light-Duty Pickup	FORD MOTOR CO	F250 XL UTILITY	2018	2029	Facilities - Maintenance Adm	Chevrolet - Silverado EV
Light-Duty Pickup	FORD MOTOR CO	F250	2019	2030	Utilities-Water Reclamation	Chevrolet - Silverado EV
Light-Duty Pickup	FORD MOTOR CO	F250 XL 8' UTIL BDY	2021	2031	Environmental-Operations	Chevrolet - Silverado EV
Light-Duty Pickup	FORD MOTOR CO	F250	2021	2031	Environmental-Operations	Chevrolet - Silverado EV
Light-Duty Pickup	FORD MOTOR CO	F250	2021	2031	Environmental-Operations	Chevrolet - Silverado EV
Light-Duty Pickup	FORD MOTOR CO	F250	2005	2024	Fire & Rescue-Logistics	Chevrolet - Silverado EV
Light-Duty Pickup	FORD MOTOR CO	F250	2006	2024	VFD-Savage	Chevrolet - Silverado EV
Light-Duty Pickup	CHEVROLET	2500	2015	2025	Fire & Rescue-Logistics	Chevrolet - Silverado EV
Light-Duty Pickup	FORD MOTOR CO	F250	2019	2024	Police-Management Svc Bureau	Chevrolet - Silverado EV
Van	GMC - GENERAL MOTORS CO	SAVANA	2006	2025	Facilities - Maintenance Adm	Ford - E-Transit Cargo Van
Light-Duty Pickup	DODGE	1500	2014	2024	Facilities - Maintenance Adm	Chevrolet - Silverado EV
Light-Duty Pickup	DODGE	RAM	2014	2024	Facilities - Maintenance Adm	Chevrolet - Silverado EV
Van	DODGE	RAM PROMASTER 1500	2014	2024	Police-Management Svc Bureau	Ford - E-Transit Cargo Van
Van	DODGE	PROMASTER 1500	2015	2024	Facilities - Maintenance Adm	Ford - E-Transit Cargo Van
Van	DODGE	Promaster 1500	2015	2024	Facilities - Maintenance Adm	Ford - E-Transit Cargo Van
Van	DODGE	Ram Cargo	2015	2024	Utilities - Administration	Ford - E-Transit Cargo Van
Van	DODGE	Promaster 1500	2015	2024	Police-Management Svc Bureau	Ford - E-Transit Cargo Van
Van	DODGE	PROMASTER 1500	2016	2024	Utilities - Administration	Ford - E-Transit Cargo Van
Van	FORD MOTOR CO	TRANSIT 150	2018	2024	Utilities - Administration	Ford - E-Transit Cargo Van
Van	FORD MOTOR CO	TRANSIT 150 MID ROOF	2019	2026	Fire & Rescue-Logistics	Ford - E-Transit Cargo Van

Vehicle Type	Make	Model	Year	Retirement Year	Base Site Name	Replacement Make/Model
Van	FORD MOTOR CO	TRANSIT 250	2020	2029	Health Dept County Funding Adm	Ford – E-Transit Cargo Van
Minivan	CHEVROLET	UPLANDER	2008	2024	Utilities-Water Reclamation	Chrysler – Pacifica Hybrid Touring L
Van	GMC - GENERAL MOTORS CO	SAVANA	2009	2024	Home & Comm Based Srvcs	Ford – E-Transit Cargo Van
Van	FORD MOTOR CO	TRANSIT CONNECT	2010	2024	Police-Management Svc Bureau	Ford – E-Transit Cargo Van
Van	FORD MOTOR CO	TRANSIT CONNECT XL	2016	2024	Police-Management Svc Bureau	Ford – E-Transit Cargo Van
Van	FORD MOTOR CO	TRANSIT CONNECT XL	2018	2024	Police-Management Svc Bureau	Ford – E-Transit Cargo Van
Van	FORD MOTOR CO	TRANSIT CONNECT XL	2018	2024	Police-Management Svc Bureau	Ford – E-Transit Cargo Van
Van	FORD MOTOR CO	TRANSIT CONNECT XL	2018	2024	Police-Management Svc Bureau	Ford – E-Transit Cargo Van
Van	FORD MOTOR CO	TRANSIT CONNECT XL	2020	2024	Police-Management Svc Bureau	Ford – E-Transit Cargo Van
Van	FORD MOTOR CO	TRANSIT CONNECT XL	2020	2024	Fire & Rescue-Logistics	Ford – E-Transit Cargo Van
Van	FORD MOTOR CO	TRANSIT	2013	2026	Fire & Rescue-Logistics	Ford – E-Transit Cargo Van
Van	FORD MOTOR CO	TRANSIT	2013	2026	Fire & Rescue-Logistics	Ford – E-Transit Cargo Van
Van	CHEVROLET	EXPRESS 3500	2006	2026	Rec, Registration, Vans	Ford – E-Transit Cargo Van
Van	FORD MOTOR CO	TRANSIT 350 XL	2018	2026	Rec, Registration, Vans	Ford – E-Transit Cargo Van
Van	FORD MOTOR CO	TRANSIT 350 XL	2018	2027	Utilities - Administration	Ford – E-Transit Cargo Van
Medium-Duty Vocational Truck	INTERNATIONAL	4700 T444E	2001	2024	Highways-Maintenance-East-Mayfield	Ford – E-Transit Chassis Cab

**Note: These are vehicles used for comparison purposes, not an endorsement of any individual EV manufacturer or model. See DOE's [fueleconomy.gov](https://www.fueleconomy.gov) website for all vehicle models available.*

Appendix C. Projected Cumulative GHG Emissions of ICE Replacement Vehicles Versus Recommended EV Replacements

Scenario One

Year	ICE Emissions (MT)	EV Replacement Emissions (MT)
2024	2,108	334
2025	4,475	696
2026	6,863	1,067
2027	9,283	1,444
2028	11,750	1,836
2029	14,388	2,250
2030	17,277	2,702
2031	20,184	3,156
2032	23,118	3,617
2033	26,051	4,077
2034	28,985	4,537
2035	31,919	4,998
2036	34,852	5,458
2037	37,786	5,919
2038	40,719	6,379
2039	41,545	6,506
2040	42,155	6,609
2041	42,743	6,704
2042	43,300	6,792
2043	43,809	6,867
2044	44,105	6,912
2045	44,149	6,921
2046	44,176	6,927

Scenario Two

Year	ICE Emissions (MT)	EV Replacement Emissions (MT)
2024	2,967	463
2025	6,418	987
2026	9,900	1,520
2027	13,416	2,063
2028	16,173	2,506
2029	18,883	2,944
2030	21,843	3,420
2031	24,821	3,898
2032	27,826	4,383
2033	30,830	4,867
2034	33,835	5,351
2035	36,839	5,836
2036	39,844	6,320
2037	42,849	6,804
2038	45,853	7,289
2039	46,699	7,422
2040	47,325	7,530
2041	47,920	7,629
2042	48,480	7,717
2043	48,992	7,793
2044	49,287	7,839
2045	49,332	7,847
2046	49,358	7,853

Appendix D. EVSE Overview

DOE’s [Alternative Fuel Data Center](#) offers resources to better understand EVSE infrastructure requirements. The following information is a primer of some of the resources available:

EVSE Charging Types

	Level 1 Alternating Current	Level 2 Alternating Current	DC Fast Charging		
Description	Uses a standard plug – 120 volt (V), single phase service with a three-prong electrical outlet at 15–20 amperage (A)	Used for both BEV and PHEV charging. 208/240 V AC split phase service that is less than or equal to 80 A.	Used specifically for BEV charging. Typically requires a dedicated circuit of 20–100 A, with a 480 V service connection.		
Connector type(s)					
	J1772 charge port	J1772 charge port	J1772 combo	CHAdeMO	Tesla combo
Use	Residential or workplace charging	Residential, workplace, or public charging	Rapid charging for transportation depots, vehicle fleets, public corridors		
Limitations	Low power delivery lengthens charging time	Requires additional infrastructure and wiring	Can only be used by BEVs currently. Higher upfront and operational costs		
Time to charge	2 to 5-mi range/1-hr charging. Depending on the vehicle battery size, PHEVs fully charge in 2–7 hours and BEVs in 14–20+ hours	10 to 25-miles range/1-hr charging. Depending on the vehicle battery size, PHEVs fully charge in 1–3 hours and BEVs in 4–8 hours	50 to 70-mi range/20-min charging. Depending on the vehicle battery size, BEVs can be fully charged in 30–60 minutes.		

Methodology for Determining Fleet EVSE Needs

Step	Description	Calculation
1. Determine Individual Vehicle Energy Use	For each vehicle, determine expected energy use in kilowatt-hours (kWh) by multiplying the vehicle's energy efficiency (kWh/mile) by the expected vehicle miles traveled (VMT) between charges.	Vehicle Energy Use (kWh) = Vehicle Energy Efficiency (kWh/mile) * VMT (mile)
2. Determine Fleet Energy Use	For each vehicle that requires charging within a certain window, sum their individual energy use requirements.	Fleet Energy Use (kWh) = Σ Vehicle Energy Use ₁ + Vehicle Energy Use ₂ + ... + Vehicle Energy Use _n
3. Identify Daily Charging Window	Identify the period of time that fleet vehicles are available to charge (e.g., 10 p.m.- 6 a.m.).	Hours (hr)
4. Identify Average Charging Demand	Divide fleet energy use by the charging window to determine average kilowatts (kW) of charging needed for truck operations.	Average Charging Demand (kW) = Fleet Energy Use also as kWh
5. Determine Average Per Vehicle Charging Demand	Divide average charging demand by the number of vehicles that require charging	Vehicle Charging Demand (kW) = Average Charging Demand (kW) / Vehicles

Appendix E. Alternative Fuel Life-Cycle Environmental and Economic Transportation (AFLEET) Tool

The analysis contained within this report used assumptions and data contained within Argonne National Laboratory's [AFLEET Tool](#) as the basis for comparison. For additional analysis, the AFLEET Tool may be used to examine the environmental and economic costs and benefits of alternative fuel and advanced vehicle technologies. AFLEET allows users to estimate vehicle and fleet petroleum use, GHG and air pollutant emissions, and TCO for light-, medium-, and heavy-duty vehicles. The tool relies on data from ANL's Greenhouse gases, Regulated Emissions, and Energy use in Technologies (GREET) model and the Environmental Protection Agency's Motor Vehicle Emission Simulator (MOVES) model.

Resources for the AFLEET Tool may be found at the following locations:

- [AFLEET Tool Online](#)
- [AFLEET Tool 2020 Spreadsheet](#)
- [User Guide for the 2020 AFLEET Tool](#)